FR

SERIES

TECHNICAL MANUAL

VERSION 1.0
June, 1999

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CHAPTER 1: MAINTENANCE

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1. Preface

This manual provides Technical Service Information for the RISOGRAPH **FR Series** duplicators.

This manual is published as a reference guide for use by RISO Group (RISO Kagaku Corp./ RISO,INC./RISO EUROPE Ltd.) Certified Technical Representatives experienced in duplicator repair and service.

This manual also provides procedures for removing and installing major components. Following these procedures will minimize machine malfunctions. This information and format will also increase technical representatives' awareness and experience regarding repairs necessary to insure end-user satisfaction.

If assistance is required, please contact one of the following:

[RISO Kagaku Corp.]
Overseas Technical Section, Technical Support Department
2-5-1, Akanehama, Narashino-shi, Chiba 275, JAPAN
TEL: (0474)52-4111 FAX: (0474)52-3106 TELEX: 252-2298RISO J

[RISO EUROPE LTD.]
Solar House, 305 Ballards Lane, North Finchley, London N12 8NP,United Kingdom
TEL: (0181)446-1188 FAX: (0181)446-9547

[RISO, INC.]

NOTE : Before attempting to correct machine malfunctions, study the Technical Manual and make sure all questions and/or concerns have been satisfied. If necessary, please use the Technical Hotline:

TECHNICAL HOTLINE

800-578-7476
(Emergency Technical Assistance Only!!!)

REFERENCE	ADDRESSES	FOR
A	RISO, INC. Tech. Support Center 310 Andover Street Danvers, MA 01923	Technical Support Operations Correspondence and Technical Training
B	RISO,INC. REPAIR DEPT. 310 Andover Street Danvers, MA 01923	Repairs and Warranty Claims

CAUTION

[Handling of Lithium Battery]

- **Never fail to follow the following instructions when you discard the used lithium battery.**

1. **Never let the battery short-circuited.**
   If the (+) and (-) terminals contact each other or metal materials, the battery will be short-circuited. If the batteries are collected and stored inorderly or one upon another, the above-mentioned case will occur.

- DANGER -

If the battery is short-circuited, it will heat up and may in some cases explode into fire.

2. **Never heat up the battery.**

- DANGER -

If you heat the battery up to more than 100°C or put it into the fire, it may burn dangerously or explode.

3. **Never disassemble the battery or press it into deformation.**

- DANGER -

If you disassemble the battery, the gas pouring out of the inside may hurt your throat or the negative lithium may heat up into fire.
If the battery is pressed into deformation, the liquid inside may leak out of the sealed part or the battery may be short-circuited inside an explode.

4. **Never fail to keep the battery out of reach of children.**
   If you put the battery within reach of children, they may swallow it down. Should they swallow the battery, immediately consult the doctor.

[Replacement of the Lithium Battery]

1. **The lithium battery must be replaced by a trained and authorized service technician.**
2. **The battery must be replaced only with the same or equivalent type recommended by the manufacturer.**
3. **Discard used batteries according to the manufacturer's instructions.**

!! WARNING !!

Important Safety Precautions

1. Always disconnect electrical supply before placing hands in the machine.

I. To avoid injuries:
Be sure to disconnect the electrical power before disassembling, assembling,or when making adjustments on the machine.

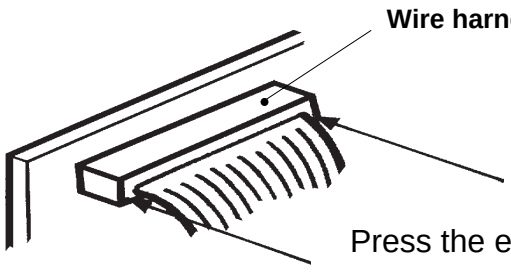
II. Protection of the machine:
Make sure to turn OFF the power to the machine before plugging or unplugging the electrical connectors, or when connecting a Meter.

2. Always connect electrical connectors firmly.

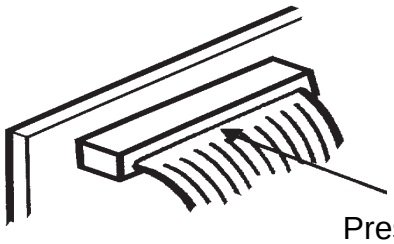
I. To avoid electrical failure:
The connectors must be connected firmly together and onto the PCBs.
Press on the ends of the connectors and then on the middle to ensure a firm fit.

II. Protection of the electrical components:
The electrical components may be damaged due to short circuits caused by a loose connector.

FIRST



THEN



2. Work Precautions

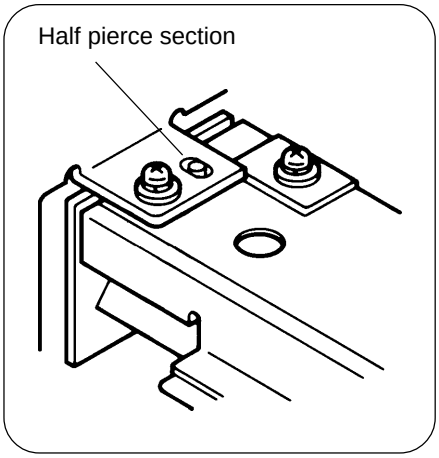
Inspection

If you discover any defects or problems during an inspection, fix the problems or if necessary take steps such as replacing a part.

Removal

Check the problem area. At the same time, examine the cause of the problem and determine whether the part needs to be removed or disassembled. Next proceed according to the procedures presented in the Technical Manual. In cases where, for example, it is necessary to disassemble areas with large numbers of parts, parts which are similar to each other, or parts which are the same on the left and right, sort the parts so that you do not mix them up during reassembly.

(1) Carefully sort the removed parts.
(2) Distinguish between parts which are being replaced and those which will be reused.
(3) When replacing screws, etc., be sure to use the specified sizes.



Assembly and Installation

Unless specified otherwise, perform the removal procedures in reverse during assembly and installation. In cases where protrusions or holes are provided to assist in positioning parts, use them for accurate positioning and securing.
(Protrusions and holes for positioning parts ⇨ Half pierce section)

Tools

Using tools other than those specified can lead to injury or damage screws and parts. Have all the tools necessary for the work available.

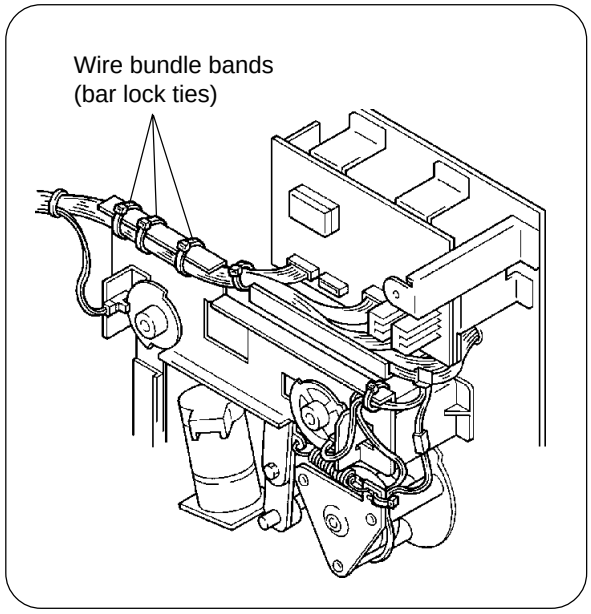
<Standard Tool list>

Type	Tip size	Shaft length, etc.
Phillips screwdriver	No. 2 No. 2 No. 2 No. 1	(250 mm) (100 mm-150 mm) (stubby type) (75 mm-100 mm)
Standard screwdriver	6 mm 3 mm 1.8 mm	(100 mm-150 mm) (100 mm-150 mm) (precision type)
Nut driver (box driver)	8 mm 7 mm	(100 mm-150 mm) (100 mm-150 mm)
High frequency driver	2.5 mm	
Spanners (may be double-ended)	5 mm 8 mm Monkey	5.5 mm 7 mm 10 mm 13 mm
Hex wrenches	5.0 mm 4.0 mm 3.0 mm 2.5 mm 2.0 mm 1.5 mm	

Type	Remarks
Steel scale	150 mm
Gap gauge	
Radial cutting pliers	
Pliers	
Nipper	
Small flashlight	
Multimeter	
Soldering iron	20 W-30 W
File	Flat, round

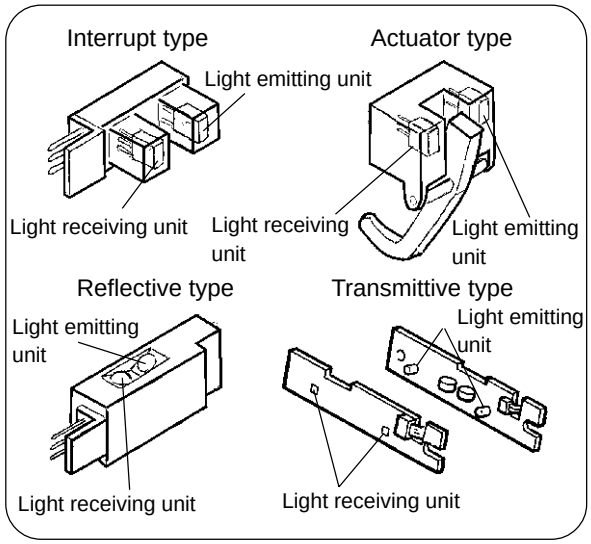
Electrical system work

- After removing wire bundles, fasten them with wire bundle bands (bar lock ties) so that they will not sag.
- When installing parts, be careful to avoid pinching or damaging the wire bundles.
- If a fuse blows, always replace it with one with the specified capacity. Using a fuse with a larger capacity can not only damage parts, but may cause fires.
- Be careful not to drop image scanners, thermal print heads, and other sensors as they can be easily damaged.



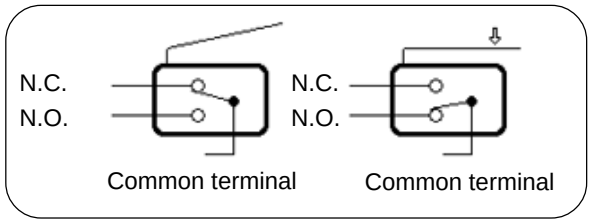
Sensor types

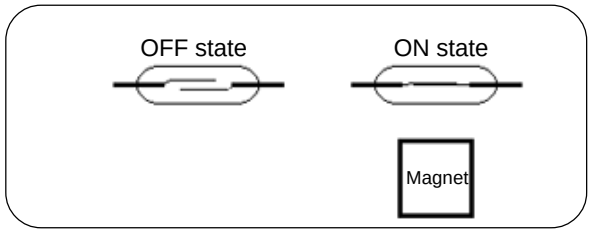
- Photo-electric sensors may be broadly divided into the following four types: interrupt types (U-shaped), actuator types, reflective types, and transmittive types.
- Magnetic sensors use Hall ICs, which react to the magnetic force in magnets.
- Always turn off the power before plugging or unplugging sensor connectors.



Switch types

- Microswitches may be divided between normally open (NO) types and normally closed (NC) types.
  With an NO connection, an internal contact is connected when the switch actuator is pressed.
  With an NC connection, an internal contact is disconnected when the switch actuator is pressed.
- Magnetic lead switches are switches in which an internal contact is connected in reaction to the magnetic force of a magnet.



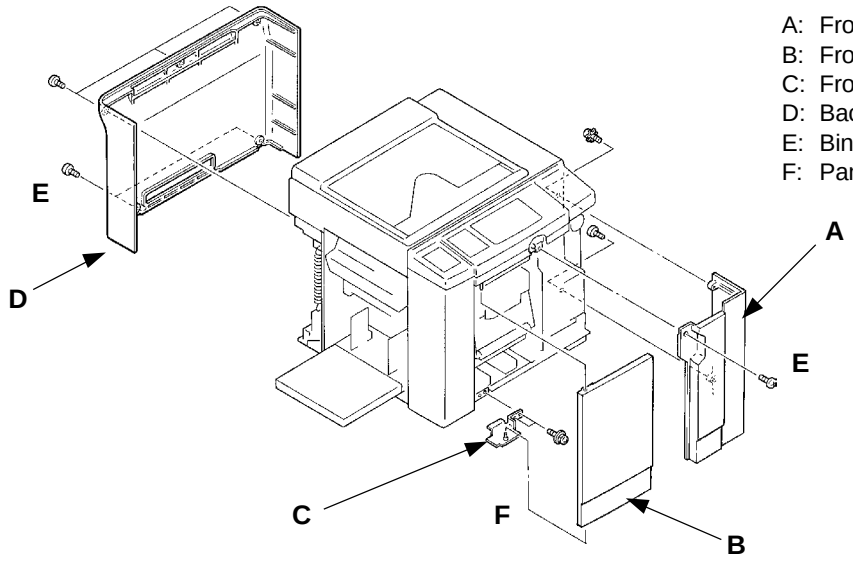


3. Exterior Cover Removal

- Removal

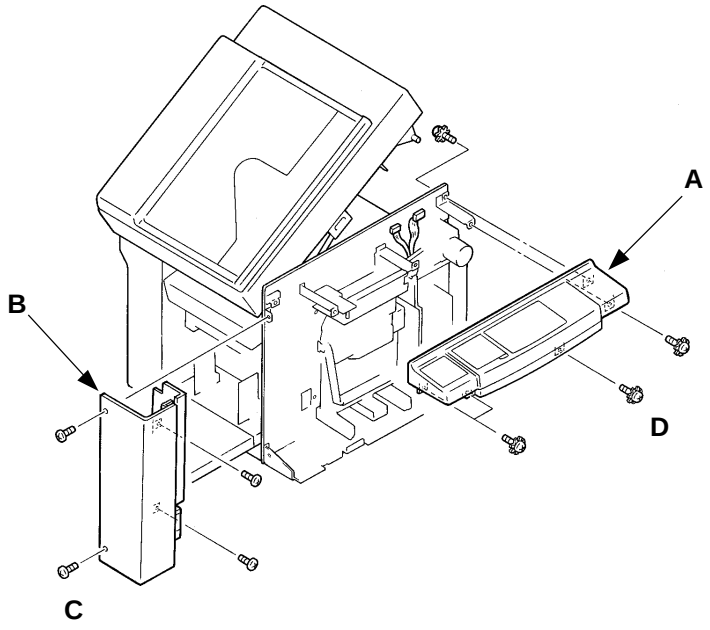
*Disconnect a power cord and remove the covers.

- Back cover
- Front cover —— Remove two mounting screws of the Front cover hinge.
- Front right cover



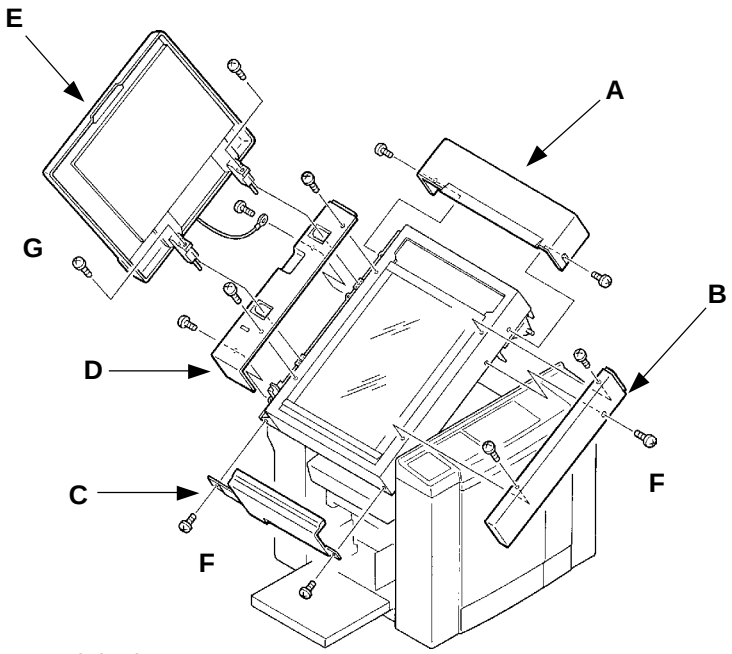
A: Front right cover
B: Front cover
C: Front cover hinge
D: Back cover
E: Bind-head Screw M4x8
F: Pan-head Screw SW.W M4x8

- Operation panel unit —— Remove the Front right cover and disconnect two connectors to remove the Panel unit.
- Front left cover



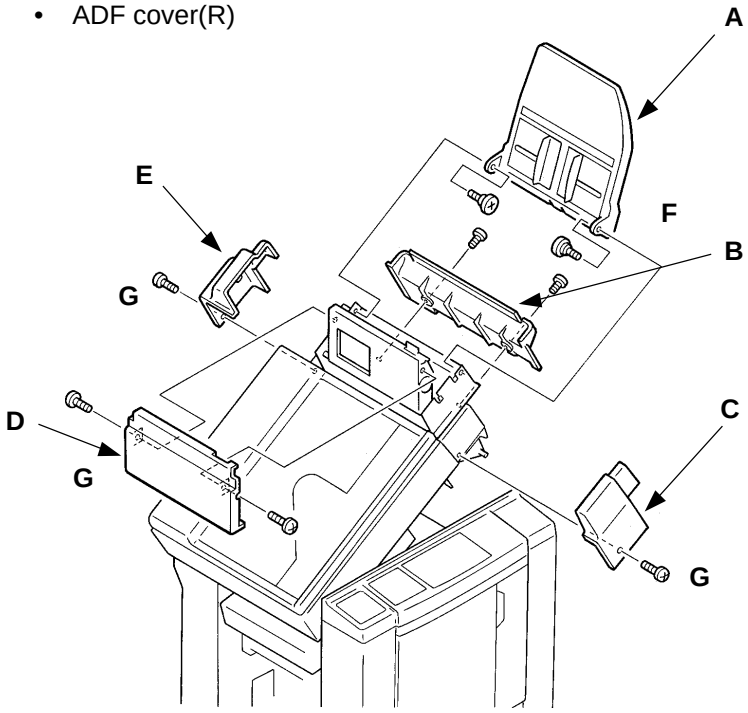
A: Operation panel unit
B: Front left cover
C: Bind-head Screw M4x8
D: Bind-head Screw TW M4x8

- Stage cover ———— Remove a ground wire to remove the cover.
- Scanner cover(Right)
- Scanner cover(R) ——— Remove them after the Stage cover.
- Scanner cover (F)
- Scanner cover(Left) —— Remove them after the Stage cover, Scanner cover(R), and Scanner cover(F) in that order.



A: Scanner cover(Right)
B: Scanner cover(F)
C: Scanner cover(Left)
D: Scanner cover(R)
E: Stage cover
F: Bind-head Screw M4x8
G: Bind-head Screw M4x10

- Original tray
- ADF cover(Right)
- ADF cover(F)
- ADF cover(Left)
- ADF cover(R)

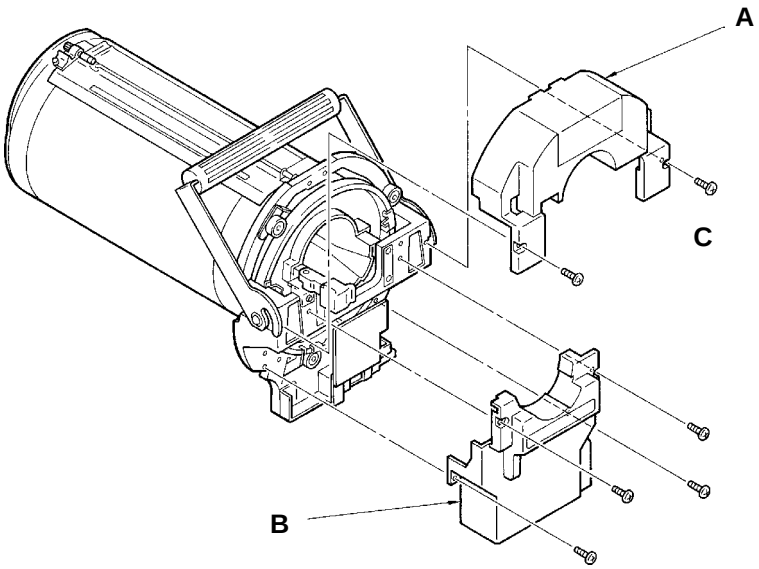


A: Original tray
B: ADF cover(Right)
C: ADF cover(F)
D: ADF cover(Left)
E: ADF cover(R)
F: Original tray shaft
G: Bind-head Screw M4x8

EXTERIOR COVER REMOVAL

- Drum cover(Upper)
- Drum cover(Lower)

A: Drum cover(Upper)
B: Drum cover(Lower)
C: Bind-head screw M3x6

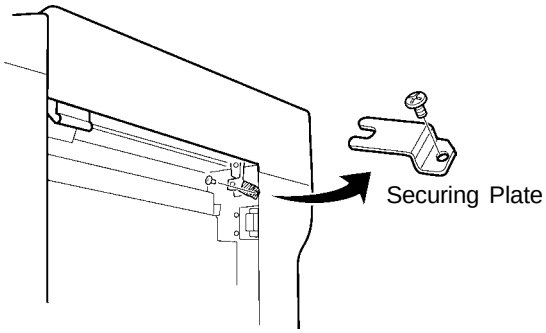


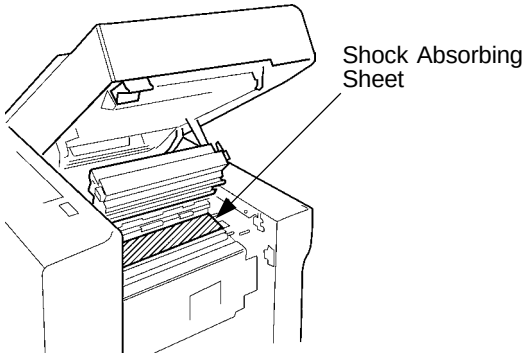
4. Installation

Be sure to follow the procedures below in installation.

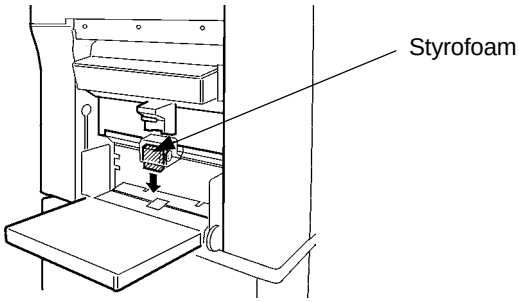
(1) Removing Protectors

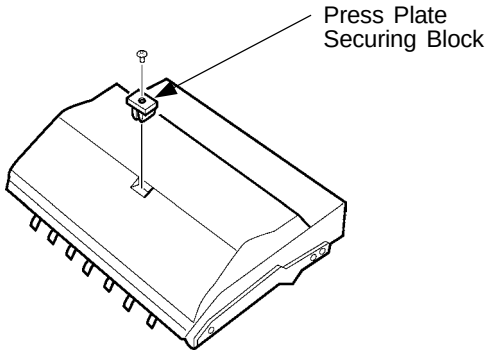
Paper Receiving Area



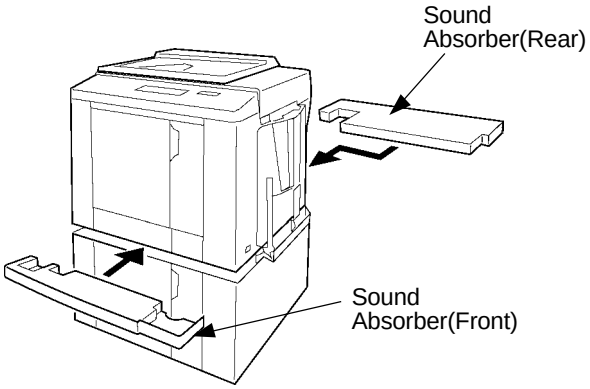


Paper Feed Area

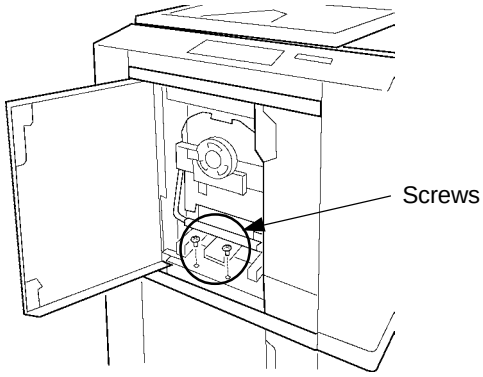




(2) Attaching Sound Absorbers



Insert two Sound Absorbers(Rear and Front) between the RISOGRAPH and the stand.



Open the Front Cover and secure the Sound Absorber(Front) with two screws.

Installation location

- Do not install the machine in any of the following locations.

(1) Those subject to direct sunlight or any bright location such as by a window (If you must install in such a location, put a curtain or the like over the window.)
(2) Those where the temperature changes drastically
(3) Those that are too hot, cold, humid, or dry
Temperature range: 15° centigrade - 30° centigrade
Humidity range: 40% - 70% No condensation allowed
(4) Those with radiant heat sources and any locations in the direct path of air from air conditioners, heaters
(5) Any poorly ventilated location
(6) Dusty atmosphere
(7) Any tilted location
(Installation height difference: 10 mm max. front - rear, 10 mm max. left - right)

Electrical connection

- Plug the plug securely into the socket so that there is no problem with the contact in the power supply plug section.
- Do not use any triplets or extension cords.
- Do not allow any other machine to stand on or crush the power cord.

Ground connection

- Always ground this machine to prevent electrical shock in the unlikely event of electrical leakage.

CHAPTER 2: MACHINE SUMMARY

Contents

1. Features of the RISOGRAPH FR 2-1
2. Specifications 2-2
3. Product Compatibility 2-6
4. Cross Sectional View 2-8
5. Machine Operations 2-9
6. Paper Feed and Receiving 2-10
7. Master Removal and Feed 2-11

1. Features of the RISOGRAPH FR

THREE FEATURES OF FR

SC Built-in (FR3950-α)

SC function built-in model will be lined up for FR series. It makes much easier to link a FR to the PC or Mac, just plug in a FR direct from the computer. This new model will give you persuasive selling point to today's computerized office as well as providing advanced image of Riso.

Quieter Operating Sound

Operating sound of the FR never disturb your work. We have succeeded in reducing the sound about 25 %, while maintaining durability of the GR series. This sound level will be accepted for the office equipment.

Improved Print Quality (New Ink and Master)

The print quality of the FR is noticeably improved with the refined TPH. The high performance new ink and high sensitive new master have been developed for best matching to produce high print quality. In addition, FR series does not required Image Enhancement mode, because it has high performance image processing program which is newly developed. Therefore, small characters and fine lines will be precisely reproduced.

Other New Functions

There are another powerful useful features which are newly added.

***2, 4, 8 and 16 up**

4 kinds multi up function has been installed.

***4 kinds screen dots**

4 kinds screen dots mode(Fine, small, medium and large) has been newly added for vireos picture processing.

***Electrical feeding tray adjustment(A3 Machine only)**

The side way print position can be adjusted ±10mm from the operation panel.

Auto Power Off

Environment-friendly RISOGRAPH requires no warming up. If it is left turned on, the auto shutoff function(OFF 5/10/30 minutes) can be set. Since the controller uses another power supply, the data can be received if the main body is turned off.

Preventive Maintenance Indication

Enter the "number of masters/print sheets" in the test mode. The overhaul and periodic maintenance timings are notified to you by displaying "MAINTENANCE <MASTER>/<PRINT> CALL SERVICE." on the liquid crystal display panel. In order to run RISOGRAPH in the better condition, keep close contact with an administrator at installation site.

2. Specifications

FR3950/FR3950α

- **Processing**
  High-speed automatic digital scanning
  Fully automatic, thermal screening duplicating system
- **Time to First Copy**
  Letter or A4 original / Approx. 17 seconds
  Ledger or A3 original / Approx. 23 seconds
- **Print Speed**
  5 selectable print speeds (60, 80, 100, 110, 120 sheets/min.)
- **Scanning Resolution**
  400 dpi
- **Original Type**
  Bound documents or sheets
- **Original Size**
  - **For the Stage Glass:**
    Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
    Min./ Business card (50 x 90mm) or 2 x 3 1/2 inch
  - **In the optional ADF Unit:**
    Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
    Min./ B6 (128 x 182mm) or 5 x 7 inch
- **Paper Size**
  Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
  Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Original Weight**
  - **For the Stage Glass:**
    10 kg (22 lbs.) or less
  - **In the optional ADF Unit:**
    Max./ 110 g/m^2 or 28-lb bond
    Min./ 50 g/m^2 or 15-lb bond
- **Paper Weight**
  Max./ 210 g/m^2 or 110-lb index
  Min./ 46 g/m^2 or 13-lb bond
- **Image Area**
  A3 Drum / 290 x 412mm
  Ledger Drum / 10.7 x 16.5 inch
- **Paper Capacity**
  1000 sheets in feed and receiving tray
  [Based on 64 g/m^2 (16-lb bond) paper]
- **Optional ADF Capacity**
  50 originals
- **Machine Weight**
  FR3950 : Approx. 118 kg (260 lbs.)
  FR3950α : Approx. 120 kg (264 lbs.)
- **Dimensions**
  [W x D x H]
  In use / 1,320 x 675 x 825mm
  52.0 x 26.6 x 32.5 inch
  In storage / 745 x 675 x 705mm
  29.3 x 26.6 x 27.8 inch
- **Power Source**
  <Requirements>
  Picture Model: 220 to 240 VAC, 50/60 Hz <3.0A>
  USA Model: 120 VAC, 60 Hz <5.0A>
  Metric Models: 110 VAC, 60 Hz <5.0A> - 110-V model
  220 to 240 VAC, 50/60 Hz <3.0A> - 220-V model

- **Reduction Parameters** 4 selectable reductions (94%, 87%, 82% and 71%)
  [94%, 77%, 75% and 66% in USA models]
- **Enlargement Parameters** 3 selectable enlargements (141%, 122% and 116%)
  [141%, 127% and 121% in USA models]
- **Zooming Parameters** 50% to 200%
- **Features** Photo processing mode, Duo processing mode, Dot-screening (4 patterns), Multi-Up printing (2,4,8 and 16 up), Bound Book precessing, Automatic idle, Scanning Contrast Adjustment (auto/manual), Auto Print Density Control, Confidential mode, Auto Power-off, Memory Mode (Memory storage of frequently used settings), Programmed printing (Programmable print grouping), Auto Ejection Guide Control, Initial Setting Customization, Interface Capabilities, Preventive Maintenance Indication, Precision Stacking Tray
- **Optional Accessories** Color drum (Cylinder), Digitizer III, Sorter TM5000, Sorter TM2500, Sheet Feeder SF3000, Job Separator III, Key/Card Counter III, Computer Interface (SC3500/5500/7700)

FR2950

- **Processing** — High-speed automatic digital scanning
  Fully automatic, thermal screening duplicating system
- **Time to First Copy** — Letter or A4 original / Approx. 17 seconds
  Ledger or A3 original / Approx. 23 seconds
- **Print Speed** — 5 selectable print speeds (60, 80, 100, 120, 130 sheets/min.)
- **Scanning Resolution** — 400 dpi
- **Original Type** — Bound documents or sheets
- **Original Size**
  - **For the Stage Glass:**
    Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
    Min./ Business card (50 x 90mm) or 2 x 3 1/2 inch
  - **In the optional ADF Unit:**
    Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
    Min./ B6 (128 x 182mm) or 5 x 7 inch
- **Paper Size** — Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
  Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Original Weight**
  - **For the Stage Glass:**
    10 kg (22 lbs.) or less
  - **In the optional ADF Unit:**
    Max./ 110 g/m^2 or 28-lb bond
    Min./ 50 g/m^2 or 15-lb bond
- **Paper Weight** — Max./ 210 g/m^2
  Min./ 46 g/m^2
- **Image Area** — B4 Drum / 251 x 357mm
  A4 Drum / 198 x 286mm
  Legal Drum / 7.9 x 13.5 inch
- **Paper Capacity** — 1000 sheets in feed and receiving tray
  [Based on 64 g/m^2 (16-lb bond) paper]
- **Optional ADF Capacity** — 50 originals
- **Machine Weight** — Approx. 112kg (247 lbs.)
- **Dimensions**
  [W x D x H]
  In use / 1320 x 660 x 825mm
  52.0 x 26.0 x 32.5 inch
  In storage / 745x 660 x 705mm
  29.3 x 26.0 x 27.8 inch
- **Power Source**
  <Requirements>
  Picture Model: 220 to 240 VAC, 50/60 Hz <3.0A>
  USA Model: 120 VAC, 60 Hz <5.0A>
  Metric Models: 110 VAC, 60 Hz <5.0A> - 110-V model
  220 to 240 VAC, 50/60 Hz <3.0A> - 220-V model

- **Reduction Parameters** 4 selectable reductions (94%, 87%, 82% and 71%)
  [94%, 77%, 75% and 66% in USA models]
- **Enlargement Parameters** 3 selectable enlargements (141%, 122% and 116%)
  [141%, 127% and 121% in USA models]
- **Zooming Parameters** 50% to 200%
- **Features** Photo processing mode, Duo processing mode, Dot-screening (4 patterns), Multi-Up printing (2,4,8 and 16 up), Bound Book processing, Automatic idle, Scanning Contrast Adjustment (auto/manual), Auto Print Density Control, Confidential mode, Auto Power-off, Memory Mode (Memory storage of frequently used settings), Programmed printing (Programmable print grouping), Auto Ejection Guide Control, Initial Setting Customization, Interface Capabilities, Preventive Maintenance Indication, Precision Stacking Tray
- **Optional Accessories** Color drum (Cylinder), Digitizer III, Sorter TM5000, Sorter TM2500, Sheet Feeder SF3000, Job Separator III, Key/Card Counter III, Computer Interface (SC3500/5500/7700)

3. Product Compatibility

Accessory Compatibility chart

PRODUCT \ APPLICABLE MODEL	FR3950α	FR3950	FR2950	GR
FR Black Drum A3	●	●	×	×
FR Color Drum A3	●	●	×	●
FR Black Drum B4/A4/L	×	×	●	×
FR Color Drum B4/A4/L	×	×	●	●
FR Black A4 WIDE Drum	●	●	×	×
FR Color Drum A4 WIDE	●	●	×	●
ADF UNIT III	●	●	●	△
Sheet Feeder SF3000	●	●	●	●
TM5000 Sorter	●	●	●	●
TM2400 Sorter	×	×	×	△
TM2500 Sorter	●	●	●	●
DIGITIZER III (S)	●	●	●	□
Key/Card Counter III (S)	●	●	●	●
Job Separator III	●	●	●	●
Interface Board III (S)	●	●	●	●
SC 3500, 5500, 7500, 7700	×*1	●	●	●*2

● : Fully Compatible
× : Not Compatible
×*1 : Built-in SC Function
●*2 : Refer to SC Technical Manual
△ : Compatible (excludes GR3770)
□ : Compatible (GR3770, GR3750, GR2750)

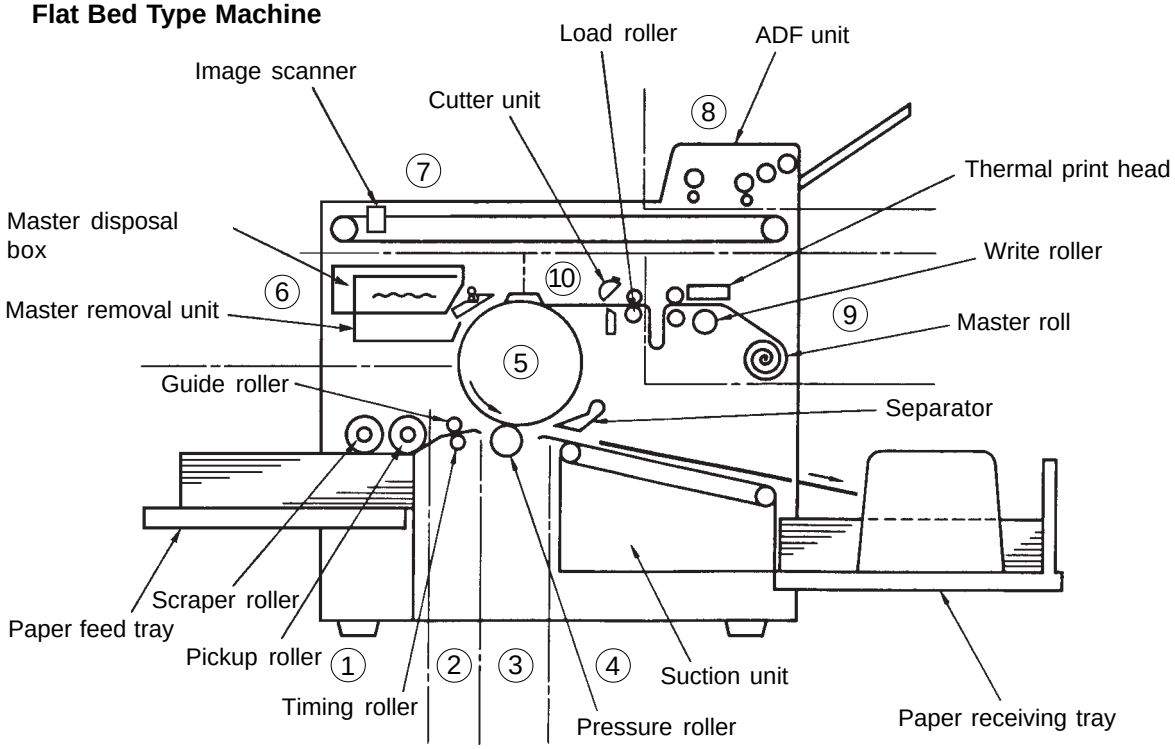
Consumables Compatibility Chart

APPLICABLE MODEL / PRODUCT	FR3950/α	FR2950	GR
RISOGRAPH FR MASTER 96W	●	×	×
RISOGRAPH FR MASTER 95	×	●	×
RISOGRAPH FR INK (BLACK)	●	●	×
RISOGRAPH FR INK (RED)	●	●	●
RISOGRAPH FR INK (BLUE)	●	●	●
RISOGRAPH FR INK (BROWN)	●	●	●
RISOGRAPH FR INK (GREEN)	●	●	●
RISOGRAPH FR INK (YELLOW)	●	●	●
RISOGRAPH FR INK (GRAY)	●	●	●
RISOGRAPH FR INK (LIGHT GRAY)	●	●	●
RISOGRAPH FR INK (MARINE RED)	●	●	●
RISOGRAPH FR INK (BRIGHT RED)	●	●	●
RISOGRAPH FR INK (BURGUNDY RED)	●	●	●
RISOGRAPH FR INK (FEDERAL BLUE)	●	●	●
RISOGRAPH FR INK (MEDIUM BLUE)	●	●	●
RISOGRAPH FR INK (PURPLE)	●	●	●
RISOGRAPH FR INK (TEAL)	●	●	●
RISOGRAPH FR INK (FLAT GOLD)	●	●	●
RISOGRAPH FR INK (ORANGE)	●	●	●
RISOGRAPH FR INK (HUNTER GREEN)	●	●	●
* ORDER COLORS	●	●	●
RISOGRAPH GR INK (BLACK)	×	×	●*1
RISOGRAPH GR INK HD (BLACK)	×	×	●*2

●*1:Compatible (excludes GR3770)
●*2:Compatible (GR3770)

4. Cross Sectional View

Flat Bed Type Machine



① **First Paper Feed Area:** Feeds single sheets of paper to the second paper feed area via the Scraper roller, Pickup rollers, and Stripper plate.

② **Second Paper Feed Area:** Controls the vertical print position and feeds paper to the print area via the Timing and Guide rollers.

③ **Print Area:** Uses the Pressure roller to press paper against the master on the Drum.
The Drum rotates with the Pressure roller and prints an image on paper.

④ **Paper Ejection Area:** Separates a printed paper from the Drum, and transports it onto the Paper receiving tray.

⑤ **Drum Section:** Supplies the Drum surface with Ink from an Ink bottle.

⑥ **Master Disposal Area:** Separates a used master from the Drum and disposes it into the Master disposal box.

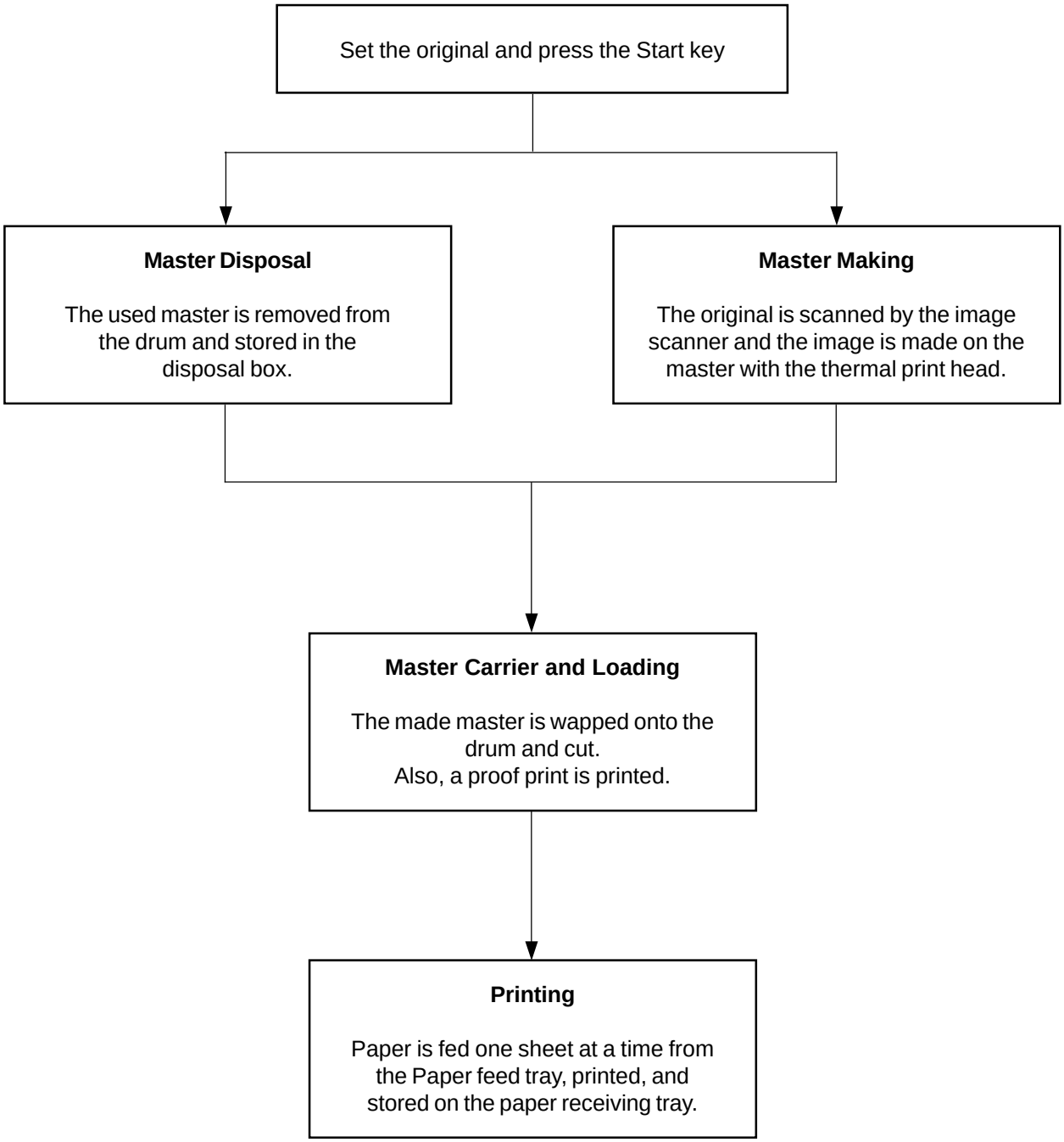
⑦ **FB Image Scanning Area:** Scans an original on the Stage glass by moving the Image scanner and converts the image information into digital data.

⑧ **ADF Image Scanning Area:** Carries an original and scans it with the Image scanner and converts the image information into digital data.

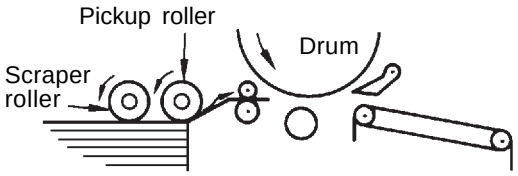
⑨ **Master Making Area:** Makes a master with the Thermal print head.

⑩ **Carrier and Clamp Area:** Feeds the prepared master material to the Drum, loads it on the Drum, and cuts it to an appopriate length.

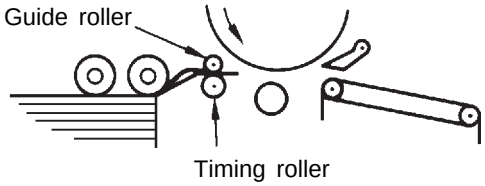
5. Machine Operations


Set the original and press the Start key
Master Disposal
The used master is removed from the drum and stored in the disposal box.
Master Making
The original is scanned by the image scanner and the image is made on the master with the thermal print head.
Master Carrier and Loading
The made master is wapped onto the drum and cut.
Also, a proof print is printed.
Printing
Paper is fed one sheet at a time from the Paper feed tray, printed, and stored on the paper receiving tray.

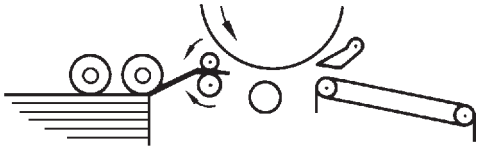
6. Paper Feed and Receiving



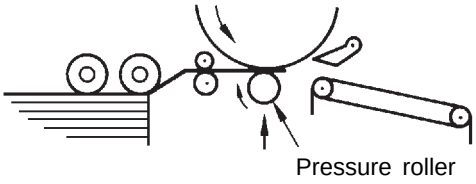
The Drum is rotated and a sheet of paper is fed from the first paper feed area to the second paper feed area by the Scraper and Pickup rollers.



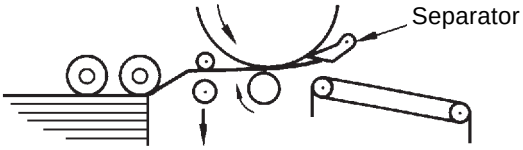
The paper feed to the second paper feed area is stopped by the Guide and Timing rollers to form a buckle. The paper then waits until the rotation of the Guide roller starts.



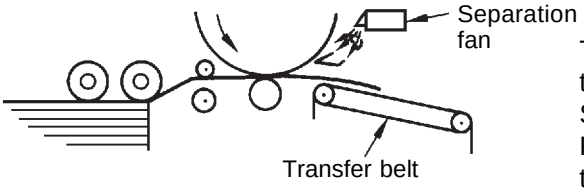
The Guide and Timing rollers in the second paper feed area are rotated and the paper is fed to the print area.



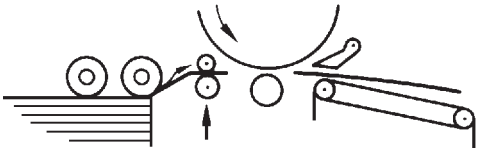
While the paper is being fed from the second paper feed area, the Pressure roller is raised and printing starts.
(The Pressure roller contacts the Drum and starts rotating.)



After the Pressure roller contacts the Drum to start printing, the Separator approaches the Drum and the Timing roller goes down.
(The paper is then transferred by the rotation of the Drum.)

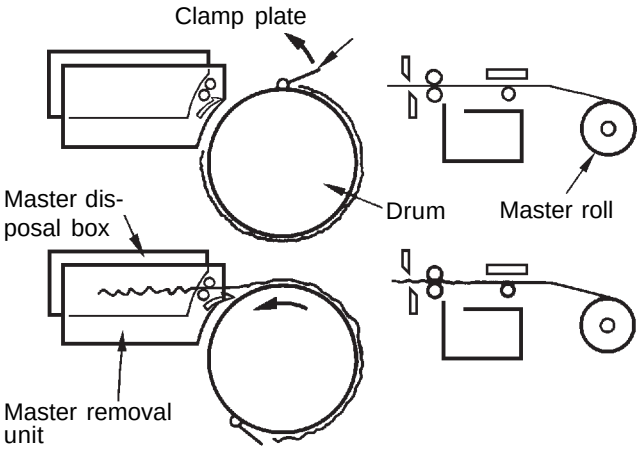


The printed paper is separated from the Drum by the Separator with a help of the air blow from the Separation fan and is transported onto the Paper receiving tray by the Transfer belts using the Suction fan.



The Timing roller contacts the Guide roller to feed the next sheet of paper.

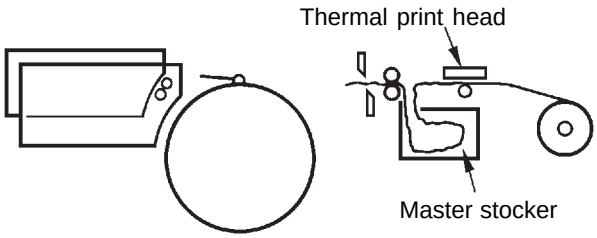
7. Master Removal and Feed



Master Removal

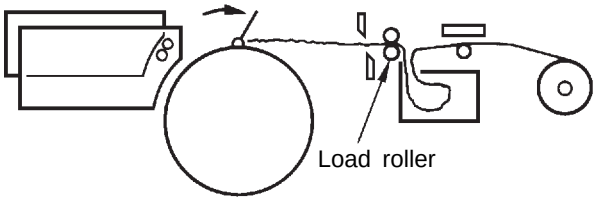
When the "START" button is pressed for master-making, the Drum is rotated to the home position and the Clamp plate is opened.

The Master removal hooks are activated, and the Drum is rotated a turn to remove a used master into the Master disposal box.



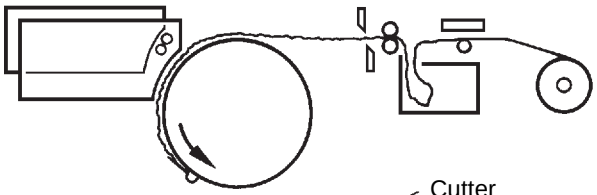
Master Making

At the same time the used master is removed from the Drum, the Image scanner scans an original and the Thermal print head makes a new master and stocks the new made master in the Master stocker.

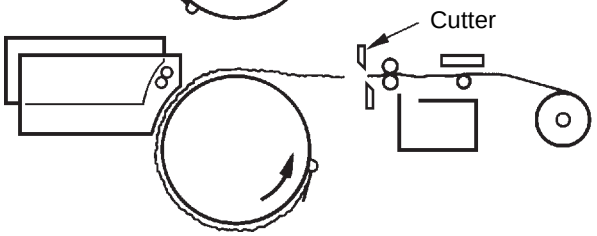


Master Loading

The lead edge of the master advances to the Drum, and the Clamp plate is closed to hold the master.



The Drum is rotated to load the master on itself.



Master loading continues until the prime surface of the Drum is covered, and then the Cutter cuts the master while the Drum still rotating.

CHAPTER 3: MAIN DRIVE SECTION

Contents

THEORY OF OPERATION

1. Main Drive 3T-1
2. Main Motor Safety Switch 3T-2
3. Other Mechanisms 3T-3

REMOVAL & ASSEMBLY

1. Main Shaft Ass'y 3R-1
2. Drive Unit 3R-2
3. Main Motor Unit 3R-3

THEORY OF OPERATION

1. Main Drive

- Rotation of Main Pulley

The Main motor provides the drive for the rotation of the Main pulley via the Cam pulley and Main belt.

- Rotation of Drum

The Main pulley is attached on the Main shaft, which is engaged with the Main shaft catch of the Drum.

While the Main motor is operating, therefore, the Drum is rotating, driven by the Main shaft.

- Control of Rotation Speed

The Main motor speed is controlled by the Encoder disc and sensor, which are attached on the top of the Main motor.

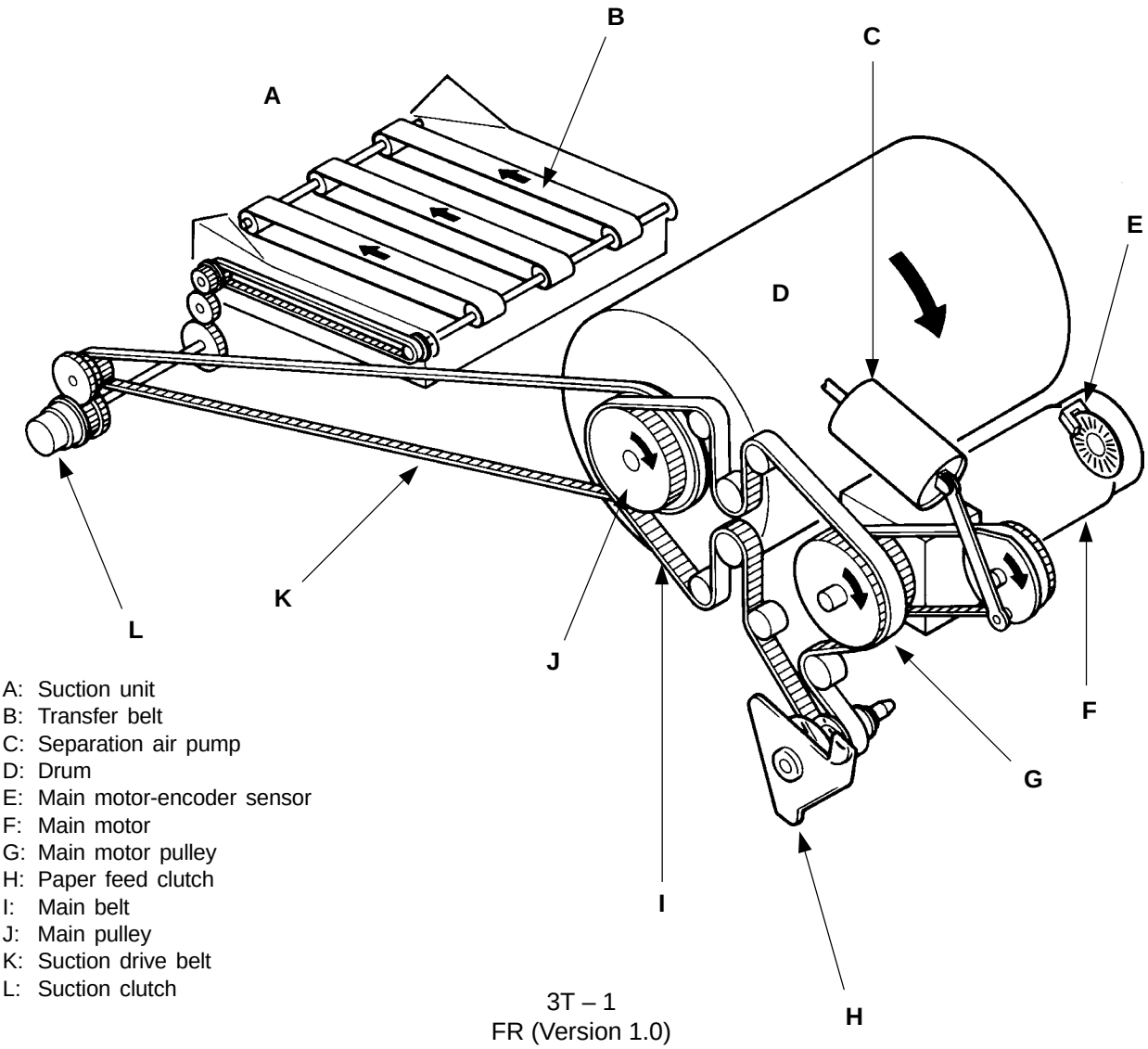
The Encoder sensor counts the number of slits of the Encoder disc which has passed the sensor in given period, and controls the actual drum rotation speed.

- First paper feed area drive

When the paper feed clutch is activated, the main drive is transferred to the First paper feed drive via clutch.

- Separation Air Pump

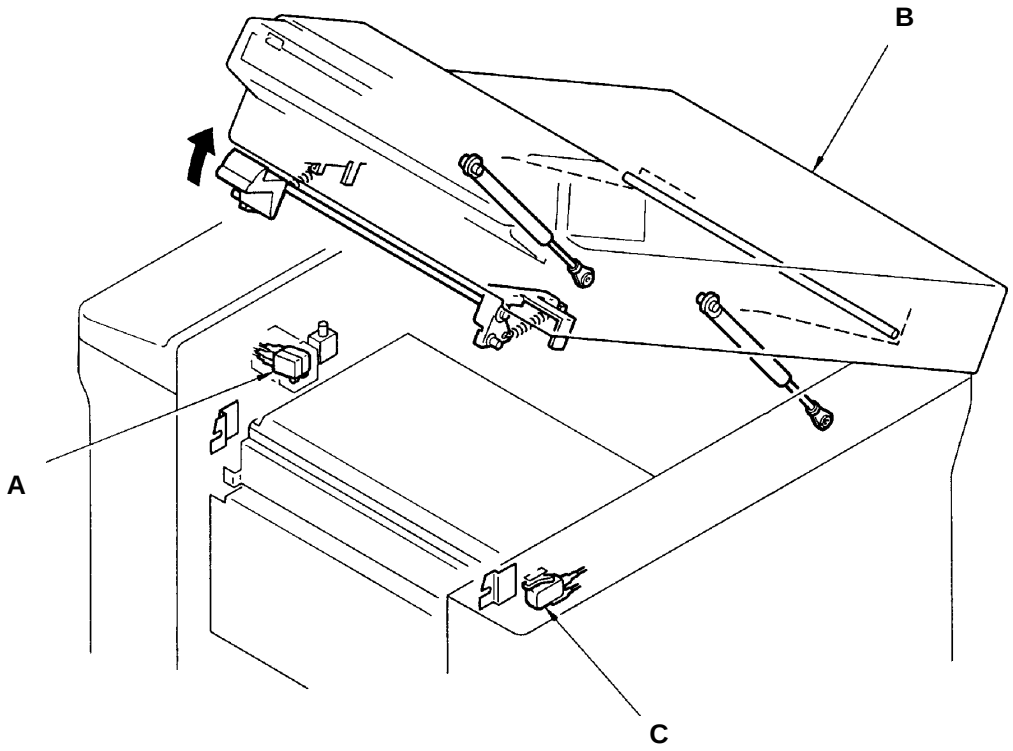
The Separation air pump is driven by the Main motor via a belt.



A: Suction unit
B: Transfer belt
C: Separation air pump
D: Drum
E: Main motor-encoder sensor
F: Main motor
G: Main motor pulley
H: Paper feed clutch
I: Main belt
J: Main pulley
K: Suction drive belt
L: Suction clutch

2. Main Motor Safety Switch

Scanner table Set SW detects if the scanner table has been set in position.
When the scanner table is left open, the interlock switch neither for the thermal print head not for the main motor can be pushed, where power supply to the main motor and to the thermal head is cut off.

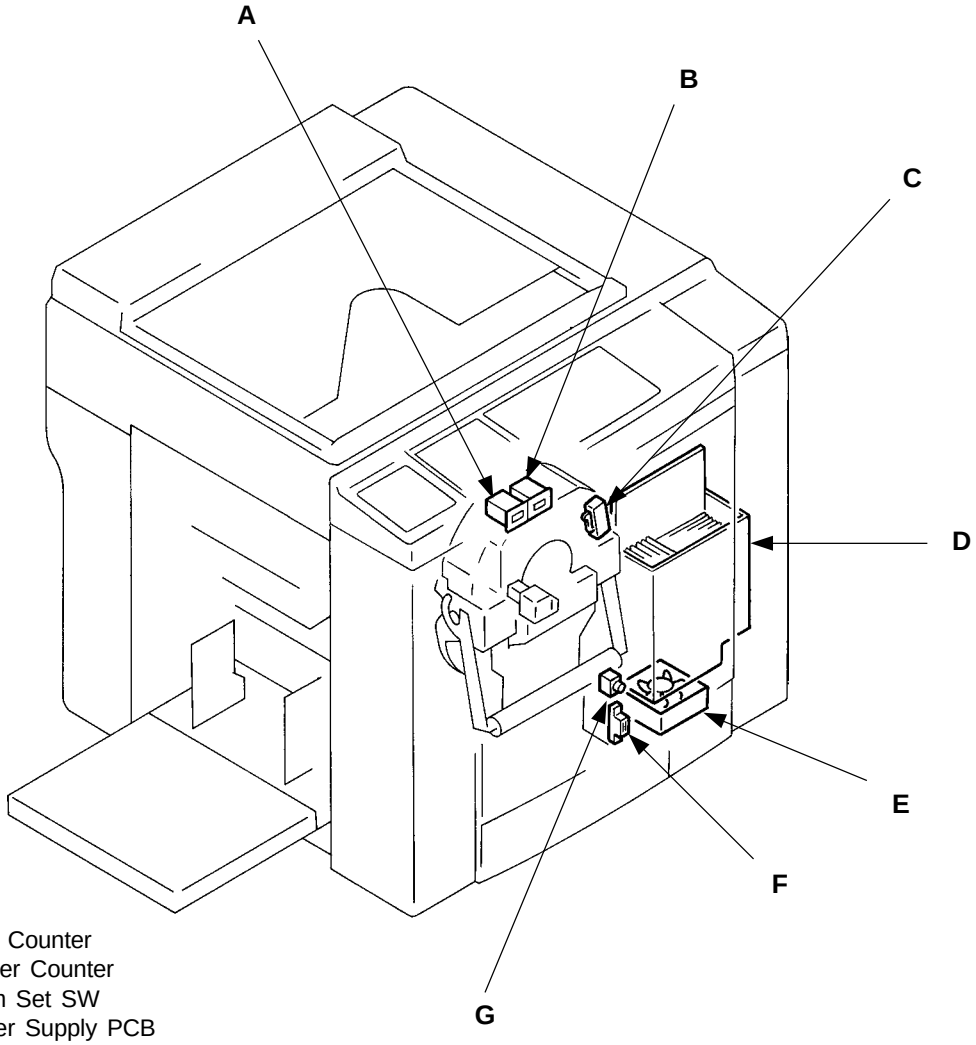


A: Interlock SW
B: Scanner table
C: Scanner table set SW

If Scanner table Set Switch or Interlock Switch (for main motor) has not been pressed, “CLOSE SCANNER TABLE” message is displayed.

Test Mode No. 16 Drum home position button
– Short interval beeps when pressed
No. 18 Drum set SW
– Short interval beeps when pressed
No. 30 Front cover set sensor
– Short interval beeps when set

3. Other Mechanisms



A: Total Counter
B: Master Counter
C: Drum Set SW
D: Power Supply PCB
E: Power Supply Cooling Fan
F: Front Cover Set Sensor
G: Drum Home Position Button

- Power Supply Cooling Fan
When the machine is in idling condition, the Power supply pcb cooling fan rotates at low speed, and at high speed when in master making or printing operation.

- Drum Home Position Button
Main motor rotates at 15 rpm while the Drum home position button is pressed with the Front cover set sensor in set condition (for servicing purpose).

- Total Counter
Total counter adds one count during printing after each paper ejection without paper jam.

- Master Counter
Master counter adds one count during master loading on drum after each master loading without master jams.

- Front Cover Set Sensor
If the Front cover set sensor is not detecting the Front cover, “CLOSE FRONT COVER” will be displayed.

MEMO

REMOVAL & ASSEMBLY

1. Main Shaft Ass'y

< Removal Procedure >

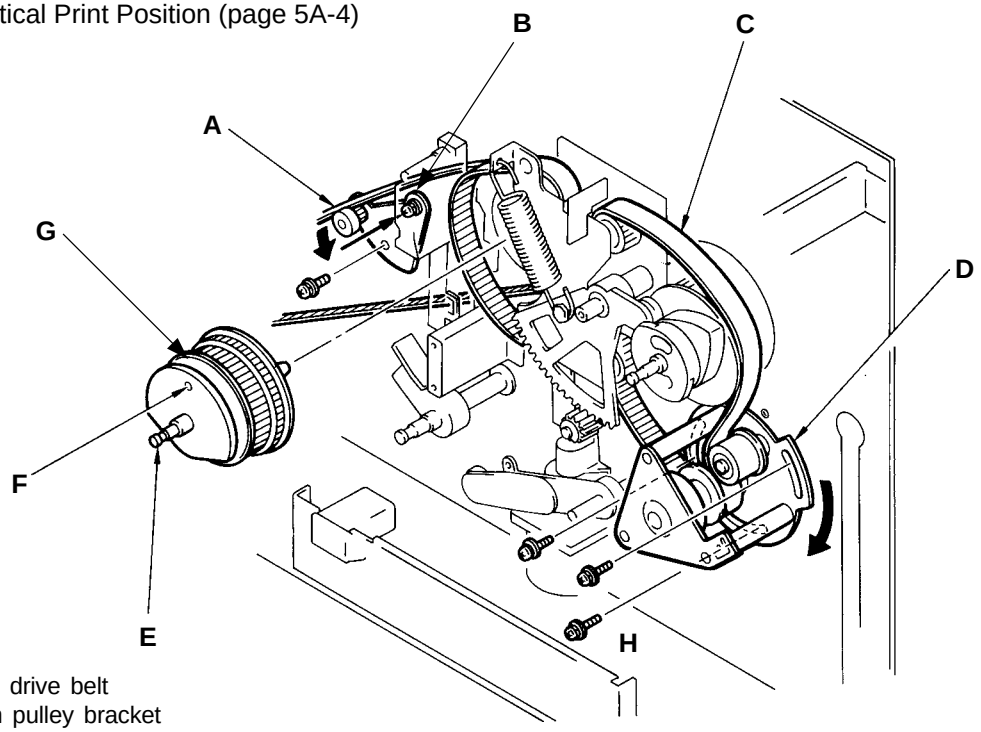
1. Lower the paper feed tray, remove the drum, disconnect the machine from the power supply and remove the following parts.
   - Scraper unit (page 4R-4)
   - Timing spring
   - P disc, Pressure sensor disc, Pressure shaft face plate, Main shaft face plate (page 6R-1)
   - Pressure Link ass'y (page 6R-2)
2. Remove three mounting screws on the Paper feed clutch base and let the Paper feed clutch unit hang free to loosen the tension of the Main belt further.
3. Loosen mounting screw on the Tension pulley bracket and loosen the tension of the Suction drive belt.
4. Remove the belts from the Main pulley and then remove the Main shaft ass'y.

- Precautions in Assembly -

- When you disassemble and reassemble the Main shaft assembly into the Pressure cam and Main shaft, align the alignment holes of the two parts with each other.
- Install the Main shaft ass'y so that the alignment hole on the Pressure cam can point up.

- Adjustments and checks after installation

- Resting Position of Pressure Lever (page 6A-3)
- Position of Pressure Sensor Disc (page 6A-7)
- Position of P Disc (page 4A-5)
- Vertical Print Position (page 5A-4)



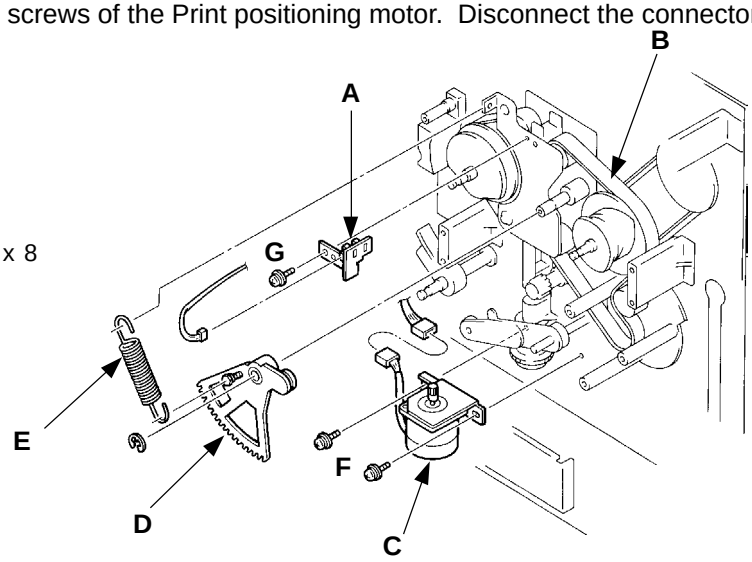
A: Suction drive belt
B: Tension pulley bracket
C: Main belt
D: Paper feed clutch base
E: Main shaft ass'y
F: Alignment hole of pressure cam
G: Alignment hole of main shaft
H: Pan-head Screw SW. W M4 x 8

2. Drive Unit

<Removal Procedure>

1. Set the Drum at the home position, lower the Paper feed tray, turn off the power, and remove the following parts.
   - Scraper Unit (page 4R-4)
   - Rear cover, timing spring (Loosen the tension of the main belt)
   - P disc, Pressure sensor disc, Pressure shaft face plate, Main shaft face plate (page 6R-1)
   - Pressure link ass'y (page 6R-2)
2. Remove the Sector gear spring, and the E-ring of the Sector gear, followed by the Sector gear.
3. Disconnect the connector of the Vertical centering sensor, remove a mounting screw of the Mounting plate, and then, remove the sensor together with the mounting plate.
4. Remove two mounting screws of the Print positioning motor. Disconnect the connector of the motor to remove.

A: Vertical centering sensor
B: Main belt
C: Print positioning motor
D: Sector gear
E: Sector gear spring
F: Pan-head Screw SW.W M4 x 8
G: IT Screw M3 x 5



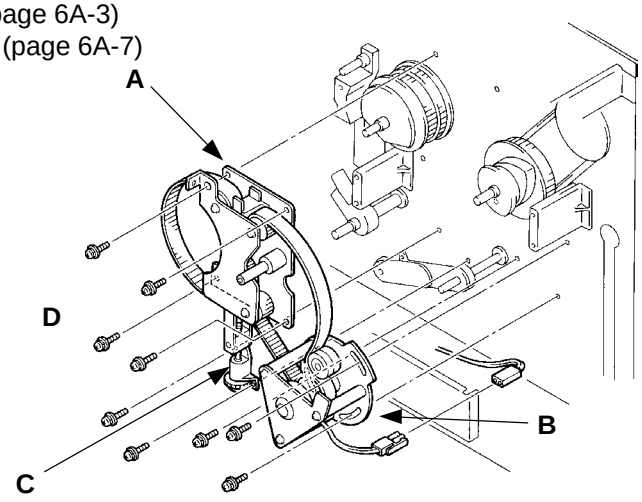
5. Remove three mounting screws on the Paper feed clutch base, four of them from the Drive unit, and two of them from the slide plate base block. Disconnect the connector of the Paper feed clutch to remove the Drive unit.

-Precautins in Assembly-

Adjustments and checks after installation

- Resting Position of Pressure Lever (page 6A-3)
- Position of the Pressure Sensor Disc (page 6A-7)
- Position of P-disc (page 4A-5)
- Vertical Print Position (page 5A-4)

A: Drive unit
B: Paper feed clutch base Ass'y
C: Slide plate base block
D: Pan-head Screw SW.W M4 x 8



3. Main Motor Unit

< Removal Procedure >

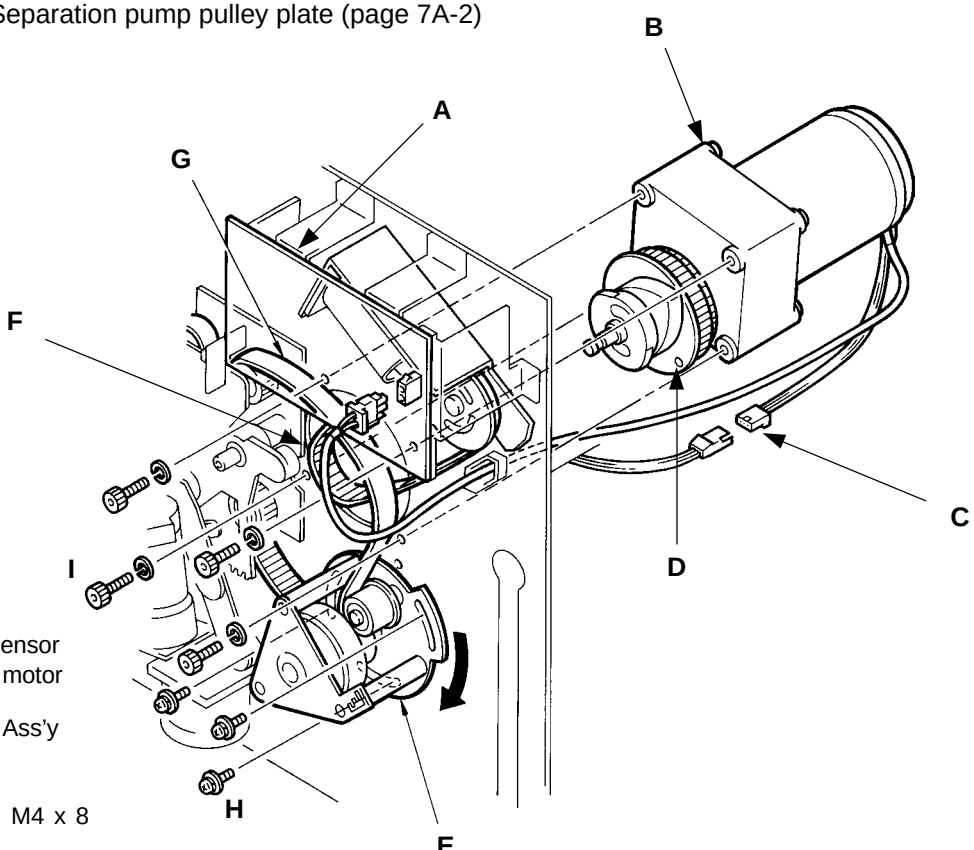
1. Lower the paper feed tray, disconnect the machine from the power supply and remove the following parts.
   - Back cover
   - Paper feed cover, Scraper unit (page 4R-4)
   - Master disposal box, Master removal unit (page 11R-1)
   - Timing spring
   - P disc, Pressure sensor disc, Pressure shaft face plate, Main shaft face plate (page 6R-1)
   - Sector gear spring
2. Remove three mounting screws on the Paper feed clutch base and let the Paper feed clutch unit hang free to loosen the tension of the Main belt further.
3. Disconnect the connector CN4 (for the Main motor) on the Motor control PCB.
4. Disconnect the connector of the Encoder sensor attached to the Main motor unit.
5. Remove four mounting screws of the Main motor unit.
6. Disengage the Main belt and Air pump drive belt from the pulleys attached to the Main motor unit and take out the unit from inside the body.

- Precautions in Assembly -

- As shown in the figure below, it is recommended to direct a hole in the pulley of the Main motor unit toward the lower right screw of the Main motor prior to setting the main belt.

- Adjustments and checks after installation

- Resting position of Pressure lever (page 6A-3)
- Position of Pressure sensor disc (page 6A-7)
- Position of P Disc (page 4A-5)
- Vertical print position (page 5A-4)
- Position of Separation pump pulley plate (page 7A-2)



A: Motor control PCB
B: Main motor unit
C: Connector of Encoder sensor
D: Alignment hole of main motor pulley
E: Paper feed clutch base Ass'y
F: Air pump drive belt
G: Main belt
H: Pan-head Screw SW.W. M4 x 8
I: Cap Screw SW

MEMO

CHAPTER 4: FIRST PAPER FEED SECTION

Contents

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REMOVAL & ASSEMBLY

1. Paper Feed Tray Unit 4R-1
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6. Paper Feed Mode (Paper Feed Clutch OFF Timing) 4A-6

LED PDTC Paper detection sensor
– Lights up when reflected light detected
Test Mode No. 55 Paper detection sensor
– Short interval beeps when reflected light detected

THEORY OF OPERATION

1. Paper Feed Tray Mechanism

- Basic

The Paper feed tray holds paper and the Paper detection sensor checks paper presence on the tray.

- Paper Side Guides Movement

The Paper side guides can be manually adjusted to the width of paper.

Sliding either of the two Paper side guides toward loaded paper centers the paper on the tray by moving the other side guide inward.

The Paper side guides have the Slide racks attached, which are linked by the Slide rack gear.

The movement of one side guide is transmitted to the other one by the racks and gear, enabling their synchronized movement.

- Paper Detection Sensor Function

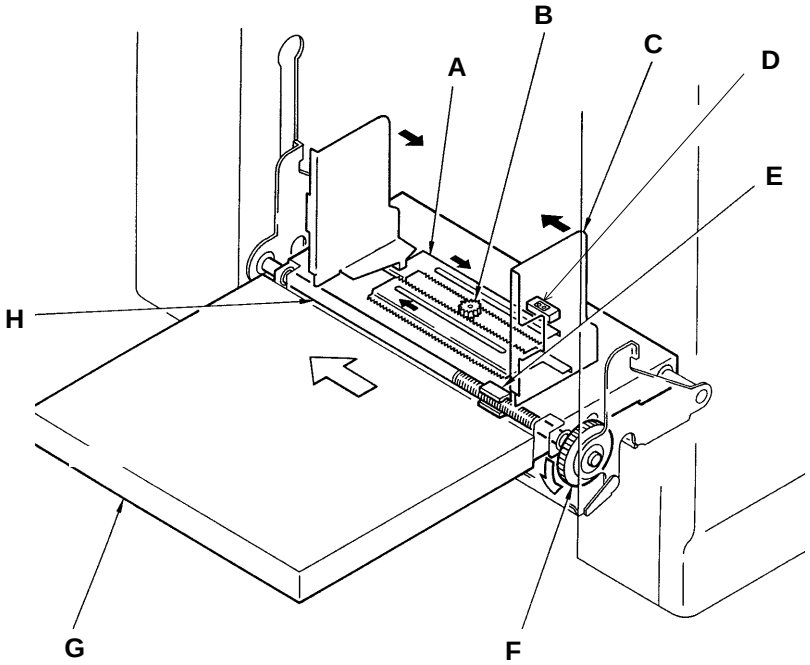
The Paper detection sensor checks the presence of paper on the Paper feed tray.

The machine goes into the printing mode only when paper is present on the Paper feed tray.

- Paper Positioning(B4)

The Paper feed tray can be shifted in both left and right directions by maximum 20mm (5mm for A3 or Ledger size paper), by manually turning the Adjustment dial.

The Adjustment dial is attached at the end of the Adjustment shaft A, which is rotated by the turn of the dial. By the rotation of the shaft, the Adjustment nut, which engages with the screw-face of the shaft, is moved to the left or right, causing the tray to move to the left or right.



A: Slide rack
B: Slide rack gear
C: Side guide
D: Paper detection sensor
E: Adjustment nut
F: Adjustment dial
G: Paper feed tray
H: Adjustment Shaft A

2. Paper Feed Tray Sliding Mechanisms(A3)

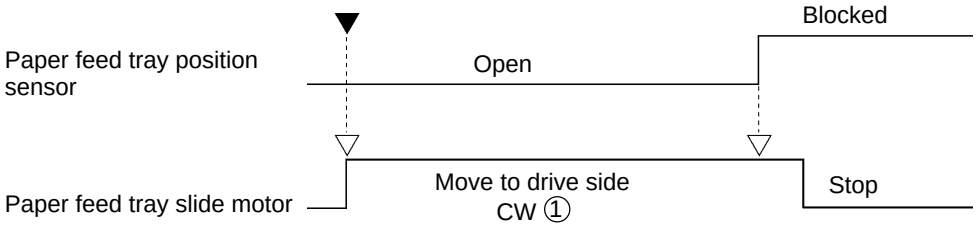
- Paper Feed Tray Slide Mechanism; A3 Machine (Horizontal Printing Position)

When the Horizontal print position key is pressed, the Paper feed tray slide motor is activated to move the paper feed tray by 10 mm to the left/right. Every time the Print position key is pressed, the paper feed tray moves by 0.5 mm. The center position of the paper feed tray is checked by the Paper feed tray position sensor. A safety switch is used to check the safety to the left and right so that the paper feed tray will not exceed a moving range.

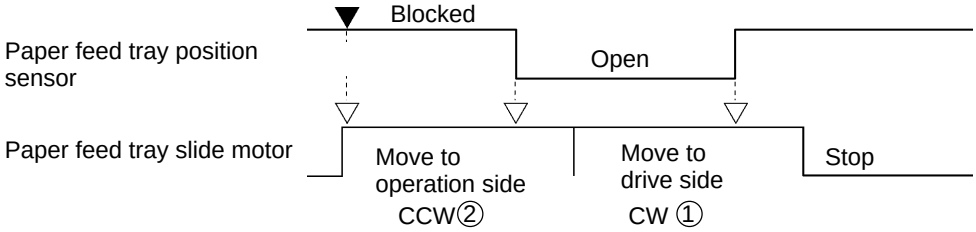
- Paper Feed Tray Initialization Mechanism

The print position is automatically returned to the center in the following cases:
1) when the power switch is turned ON, 2) when the “Centering” button is pressed, and 3) when the “RESET” button is pressed.

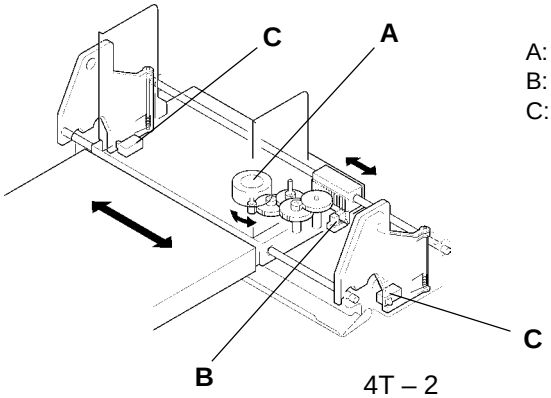
The Paper feed tray is towards the Operation side.
(The light path of the Paper feed tray position sensor is opened.)



The Paper feed tray is in the center position or towards the drive side.
(The light path of the Paper feed tray position sensor is blocked.)



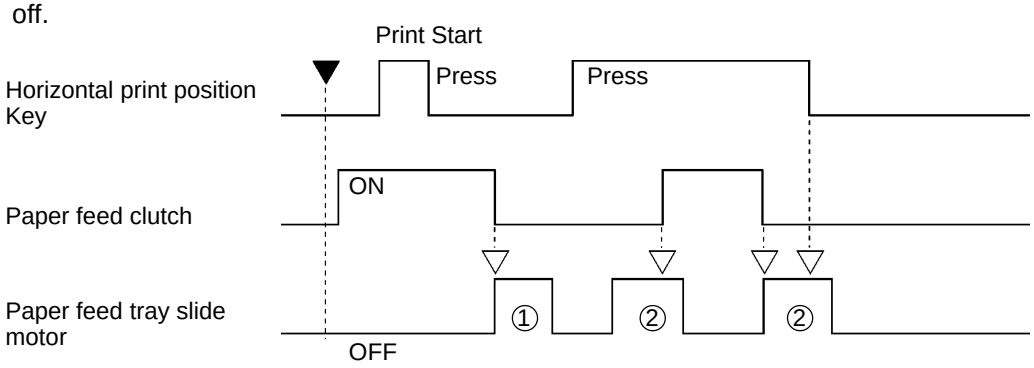
① If the Paper feed tray is located on the operation side (the Paper feed tray position sensor is opened) at centering start, the Paper feed tray slide motor will rotate in the clockwise until the light path of the Paper feed tray position sensor is blocked.
② If the Paper feed tray is located on the center or drive side (the Paper feed tray position sensor is blocked) at centering start, the Paper feed tray slide motor will rotate in the counter clockwise direction until the light path of the position sensor is opened, and then the motor is rotated in reverse until the light path is blocked again.
③ If the paper feed position sensor remains unchaged within 165 pulses (about 15mm) after the paper feed tray slide motor is turned on, “T30 CALL SERVICE” will be displayed.



A: Paper feed tray slide motor
B: Paper feed tray position sensor
C: Paper feed tray safety SW

- Paper Feed Tray Slide Mechanism during printing

Only while the Paper feed clutch is turned off, the Paper feed tray slide motor runs to move the Paper feed tray to the left/right. If the Horizontal print position key is pressed while the Paper feed clutch is turned on, the paper feed tray will move to the left/right after the clutch is turned off.

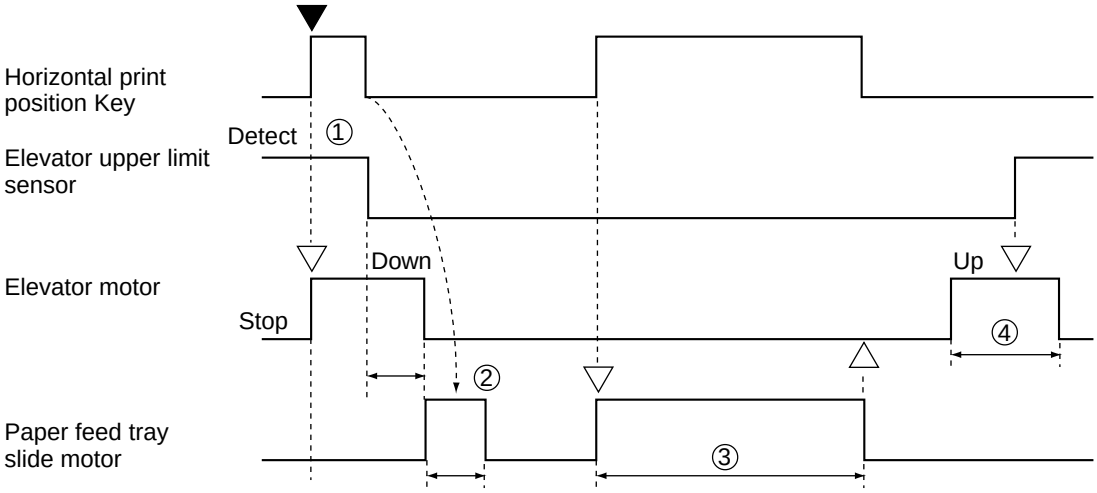


① If the Horizontal print position key is pressed while the Paper feed clutch is turned on, the slide motor will run after the clutch is turned off.

② If the Horizontal print position key is held down, sliding operation will be performed when the Paper feed clutch is turned off. If the Paper feed clutch is turned on during continuous operation, the Paper feed tray will stop once and restart moving after the Paper feed clutch is turned off.

- Paper Feed Tray Slide Mechanism during idle condition

If the Horizontal print position key is pressed while the Elevator upper-limit sensor is detecting the paper feed tray at print suspension time, the slide motor will run after lowering the the paper feed tray. The paper feed tray will move to the left/right that much, and then, it will move up until the upper-limit sensor detects it again.



① If the Elevator upper-limit sensor detects the paper feed tray, the elevator will be lowered.

② After confirming that the elevator motor has stopped, the Paper feed tray starts moving to the left/right.

③ If the Elevator upper-limit sensor does not detect the paper feed tray, operation will start the moment the print position key is pressed.

④ After moving to the left/right, the elevator motor runs to move up the paper feed tray until the Elevator upper-limit sensor is turned on.

LED PTLS Paper size detection sensor
– Lights up when reflected light detected.
Test Mode No. 2 Paper size detection sensor
– Short interval beeps when reflected light detected.

3. Paper Width Detection System

- Basic

The Paper feed tray is equipped with the Paper size potentiometer and Paper size det. sensor, which check the size and set direction of paper loaded on the tray.

According to the detected paper size and direction, the Jump wings are automatically positioned in the Suction unit to secure better paper ejection and an image area is limited on a master not to go beyond printing paper size.

- Paper Width Detection

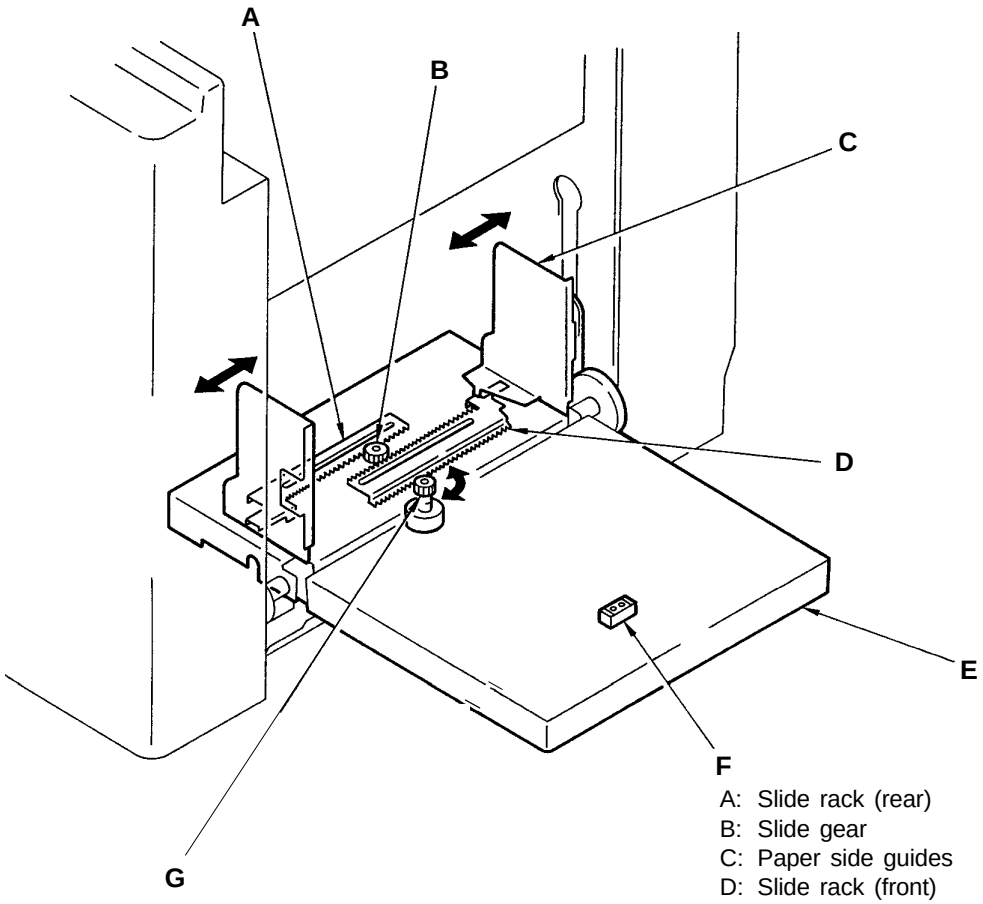
The movement of the Paper side guides are transmitted to the Paper size potentiometer via the Slide racks.

When the side guides are moved and set against the paper on the Paper feed tray, the potentiometer rotates and detects the paper width.

- Paper Direction Detection

The Paper size det. sensor checks whether paper is loaded on the paper feed tray, longways or sideways.

If the sensor detects paper (reflected light), it is assumed that paper is loaded longways.



A: Slide rack (rear)
B: Slide gear
C: Paper side guides
D: Slide rack (front)
E: Paper feed tray
F: Paper size det. sensor
G: Paper size potentiometer

Paper Size Definition

(1) Metric Models

Paper width(mm)	Paper Size Det. Sensor Status	Defined Paper Size
307~292	ON OFF	A3(Portrait) A4(Landscape)
291~269	–	No definition
268~252.0	ON OFF	B4(Portrait) B5(Landscape)
251~227	–	No definition
226~206	ON OFF	Fools cap A4(Portrait)
205~193	–	No definition
192~178	ON OFF	No definition B5(Portrait)
177~68	–	No definition

(2) US Models

Paper width(mm)	Paper Size Det. Sensor Status	Defined Paper Size
307~292	ON	No definition
291~274	ON OFF	Ledger(Portrait) Letter(Landscape)
273~226	–	No definition
225~212	ON OFF	Legal(Portrait) Letter(Portrait)
210~151	–	No definition
150~136	ON OFF	No definition Statement(Portrait)
135~68	–	No definition

Motor Control PCB LEDI
– Lights up when pressed.
LED P-UP Elevator Upper limit sensor
– Lights up when pressed.

4. Paper Feed Tray Elevation System

- Basic

The Paper feed tray can move up and down depending upon the function selected.

- Paper Detection Sensor

The Paper detection sensor checks whether the paper is set on the Paper feed tray.
The START button is only active when the paper detection sensor detects the paper on the Tray (the sensor's light is reflected back).

- Elevation of Feed Tray

When the START button is pressed, the elevator motor lifts the Paper feed tray until the Upper limit sensor of the Tray is pressed.
When the Upper limit sensor is pressed, the Elevator motor turns in the reverse direction to lower the Tray down just a little bit and then rotates in the original direction again to raise the Tray until the Upper limit sensor is pressed for the second time.
Printing is then started by the Main motor, turning the Drum.

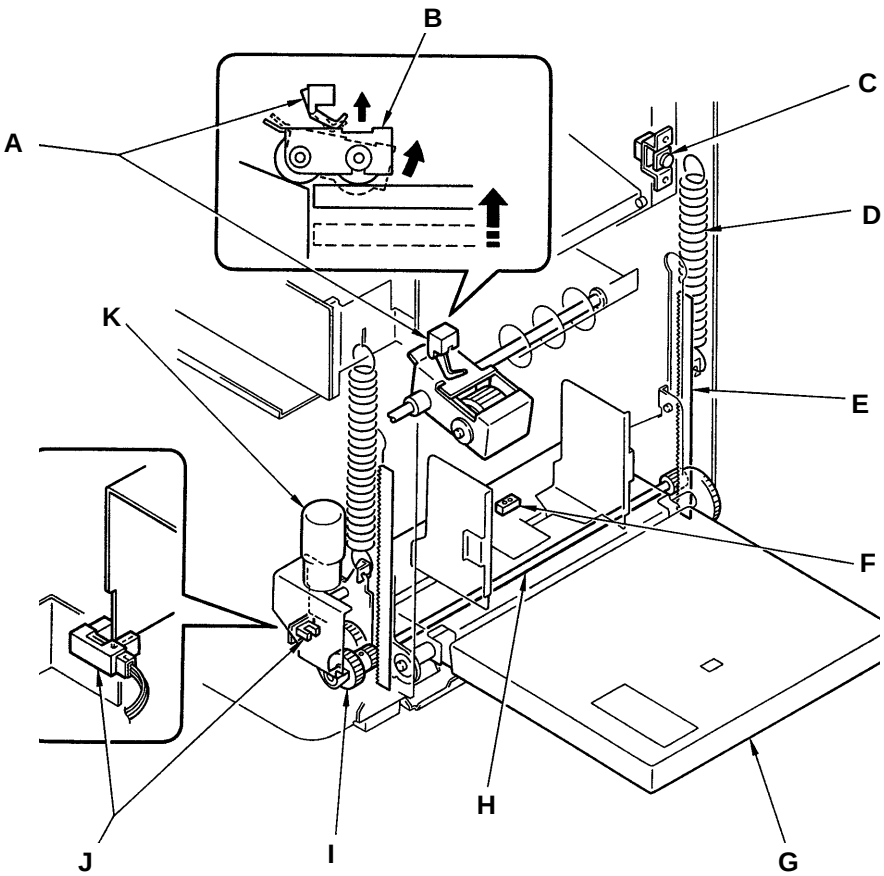
- Elevation during printing

During the printing as the height of the paper descreases (Upper limit sensor is released), the Elevator motor rotates to raises the tray until the Upper limit sensor is pressed again.
This operation is repeated to maintain the paper feed tray height, until the paper supply is depleted.

- Lowering of Feed Tray

The Paper detection sensor detects when the paper has run out, (the sensor's light does not reflect back).
The Elevator motor rotates to bring the Tray down, until the light path of the Lower limit sensor is cut.
If the Elevator down button is pressed while the machine is idle, the Elevator motor turns to lower the Tray until the button is released or the light path of the Lower limit sensor is cut.

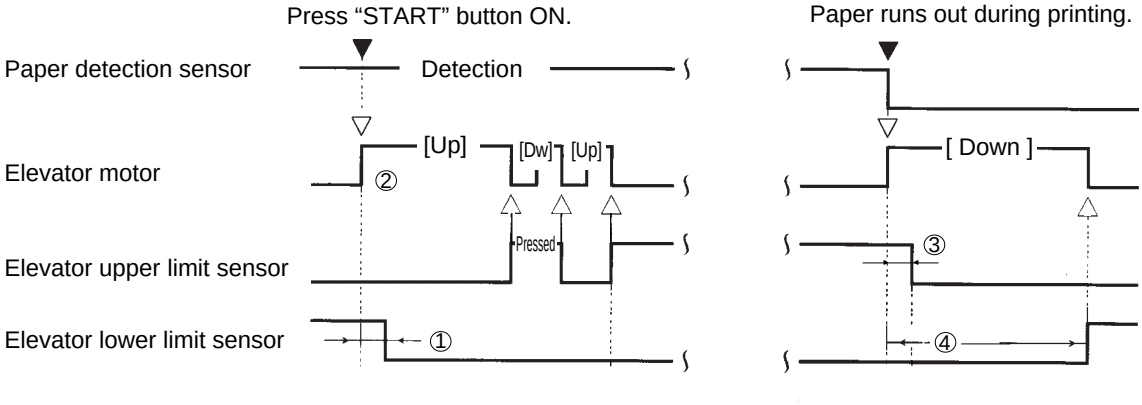
A: Upper limit sensor
B: Scraper unit
C: Elevator down button
D: Elevator spring
E: Elevator rack
F: Paper detection sensor
G: Paper feed tray
H: Elevator shaft
I: Elevator gear
J: Lower limit sensor
K: Elevator motor



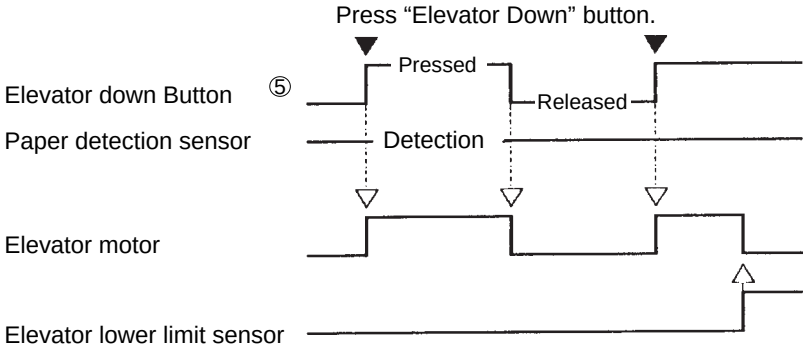
Test Mode No. 3 Elevator lower limit sensor
– Short interval beeps when light path is blocked.
No. 12 Elevator down button
– Short interval beeps when pressed.
No. 102 Elevator operation

- Timing Chart -

Paper Feed Tray Elevation System



During Idling



① If the light path of the Elevator lower limit sensor has not been opened **within 3 seconds** after the Elevator motor starts to raise the Paper feed tray, the machine assumes the Elevator motor has been locked and displays the error code **[T 02]**.
② If the actuator of the Elevator upper limit sensor has not been pressed (to open the light path of the sensor) **within 9 seconds** after the Elevator motor starts to raise the Paper feed tray, the machine assumes the Elevator motor has been locked and displays the error code **[T 02]**.
③ If the actuator of the Elevator upper limit sensor has not been released (to cut the light path of the sensor) **within 3 seconds** after the Elevator motor starts to lower the Paper feed tray, the machine assumes the Elevator motor has been locked and displays the error code **[T 02]**.
④ If the light path of the Elevator lower limit sensor has not been cut **within 9 seconds** after the Elevator motor starts to lower the Paper feed tray, the machine assumes the Elevator motor has been locked and displays the error code **[T 02]**.
⑤ The Elevator down button cannot be activated while the machine is printing.

T2 (Elevator Motor Lock)
• Elevator upper-limit sensor not turned on/off
• Elevator lower-limit sensor not turned on/off

5. Paper Feed Tray Safety System

- Basic

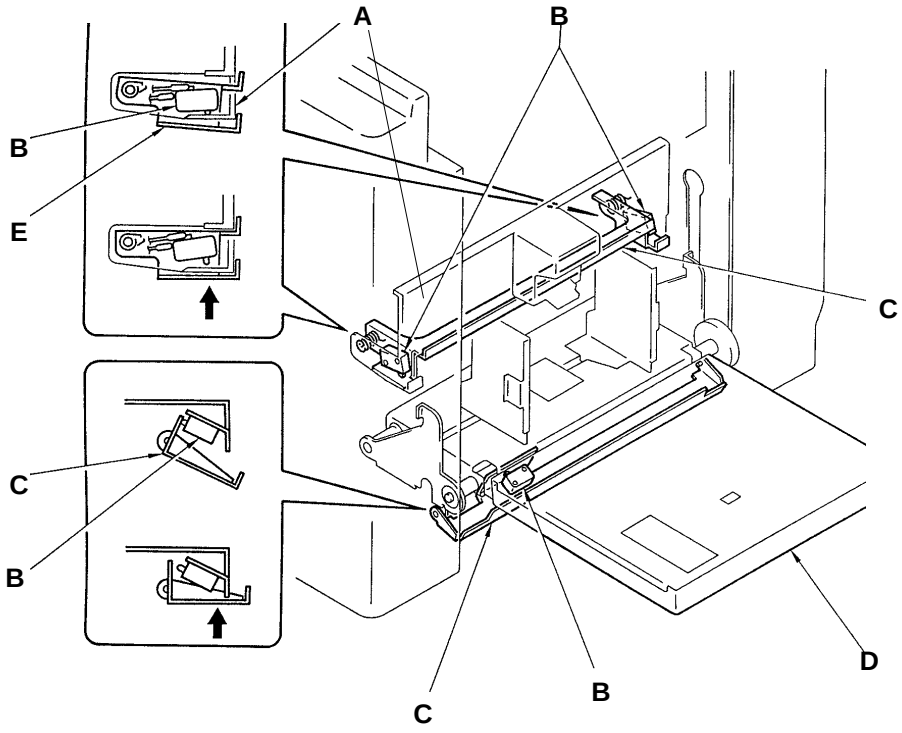
The Paper feed tray is equipped with safety systems.

- Paper Feed Tray Safety System

The safety systems are located at the bottom of the Paper feed cover and under the Paper feed tray.

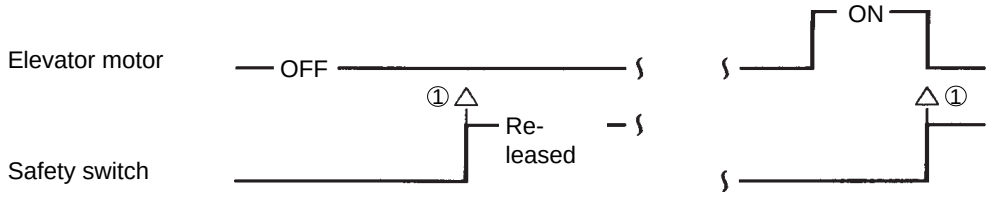
If the actuator plate is pressed in either of these safety systems, safety switches are released in the safety system whose actuator plate is pressed, by which the machine assumes that an obstacle has been stuck on or under the Paper feed tray and displays an error message to interrupt the machine operation.

A: Paper feed cover
B: Safety switch
C: Safety switch actuator plate
D: Paper feed tray
E: Safety switch bracket



- Timing Chart -

Paper feed tray safety system



① When the Safety switch is released, the machine assumes that an obstacle has been stuck on or under the Paper feed tray and the Elevator motor makes an emergency stop, causing the error message “CHECK PAPER FEED AREA” displayed.
In normal operating condition, the Safety switches are pressed.

6. Paper Feed Pressure Select System

- Basic

Paper feed pressure is changed by the Paper feed pressure adjustment lever.

- Paper Feed Pressure Adjustment Lever

The Paper feed pressure adjustment lever is located above the Scraper unit and positioned at two levels, high ("NORMAL") and low ("CARD"), securely with the help of the Lever spring attached to the left side of the lever.

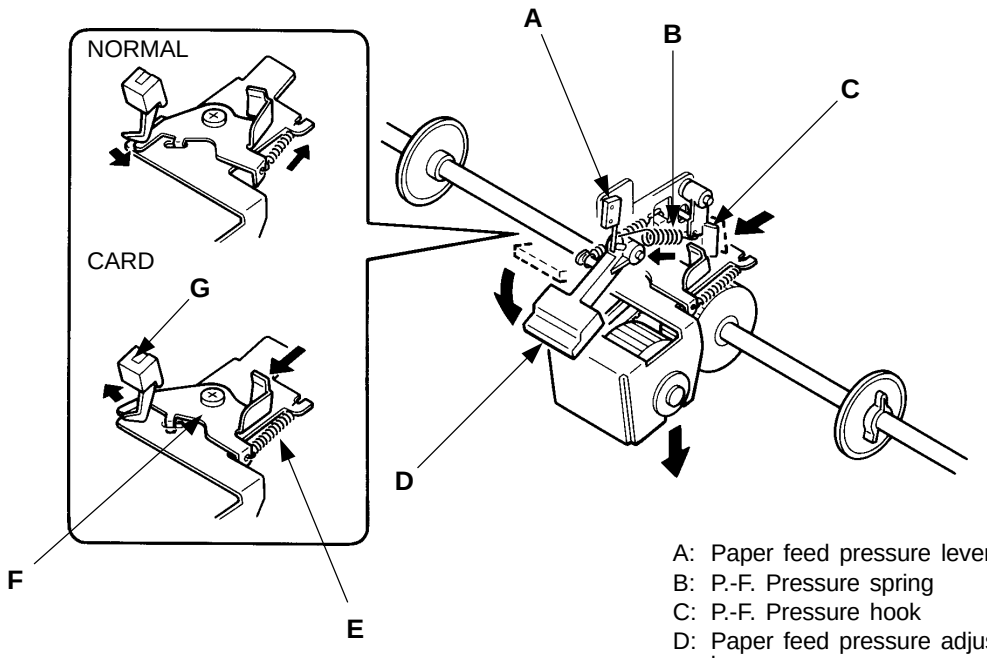
- Pressure Selection

The P.-F. Pressure spring is hooked to the Paper feed pressure adjustment lever at one end and to the P.-F. Pressure hook at the other end.

The lever, when set low for "CARD", pulls the hook via the spring. The pulled hook pushes down the Scraper ass'y against the loaded paper, giving more feeding pressure than by the assembly's weight. When the lever is set high for "NORMAL", the feeding pressure is less because no pressure is given other than the weight of the Scraper ass'y with the relaxed spring.

- Paper Feed Pressure Switch

Shifting the paper feed pressure adjustment lever to “CARD” presses the Paper Feed Pressure switch and causes the jump wing to change its operation. When “CARD” is selected, the upper-limit arm causes the paper feed tray upper-limit position to be slightly higher.



A: Paper feed pressure lever SW
B: P.-F. Pressure spring
C: P.-F. Pressure hook
D: Paper feed pressure adjustment lever
E: Upper arm spring
F: Upper arm plate
G: Elevator upper limit sensor

LTD PDF2 Paper feed clutch sensor
– Lights up when light path is blocked.
LED P-IN Paper feed detection sensor
– Lights up when light path is blocked.

7. First Paper Feed Rollers Rotary System (Activate by the paper feed clutch sensor)

- Basic

The Scraper and Pickup rollers are driven by the Paper feed clutch.

- Paper Feed Clutch Sensor & P Disc

The Paper feed clutch is activated by the paper feed clutch sensor.
When the Main motor rotates, the P disc rotates clockwise through the Paper feed clutch sensor.
If the light path of the Paper feed clutch sensor is opened, the Paper feed clutch is engaged.
If the light path of the Paper feed clutch sensor is blocked, the Paper feed clutch is disengaged.

- Transmission of Rotation Power

The Paper feed clutch is driven by the Main belt.
When the Paper feed clutch is activated, clutch components are engaged by the electromagnet, transmitting the rotation of the Main belt to the Pickup roller via the Pickup roller shaft.
The Pickup and Scraper rollers drive paper to the second paper feed section.

- Prevention of Brake Effect by Pickup and Scraper Rollers

The Pickup and Scraper rollers have one-way bearings built-in.
The one-way bearings allow the paper to feed into the second paper feed section freely.

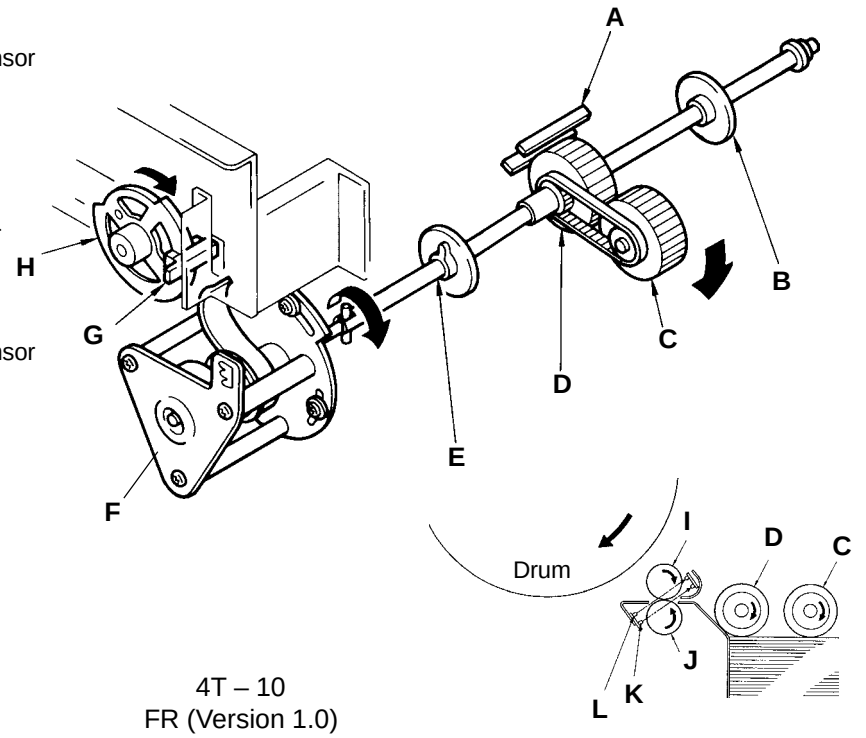
- Paper Feed Detection Sensor

To monitor the timing of paper transfer to the second paper feed section, a photo sensor, i.e. Paper feed detection sensor, is installed before the Guide roller.
When the paper feed detection sensor detects paper, the paper feed clutch is disengaged a preset period later and the first paper feed operation is completed.
At this time, the leading edge of the paper comes into contact with the guide and timing rollers to sag. In order to cause the paper to sag at a constant rate before second paper feed starts, even if a printing speed changes, the OFF timing of the paper feed clutch is changed depending on the printing speed and the type of printing paper used.(Note 1)
If the light path of the Paper feed clutch sensor is blocked by the P disc before the Paper feed detection sensor detects paper, the paper feed clutch is disengaged at once to end the first paper feed operation even though the Paper feed detection sensor has not detected paper.

[Note 1]

The paper sag rate can be adjusted depending on setting of the paper in the user mode and the paper feed clutch OFF delay time of the Memory switch(Test mode).

A: Paper feed detection sensor
B: Paper guide roller
C: Scraper roller
D: Pickup roller
E: Pickup roller shaft
F: Paper feed clutch
G: Paper feed clutch sensor
H: P Disc
I: Guide roller
J: Timing roller
K: Paper feed detection sensor
L: Paper sensor

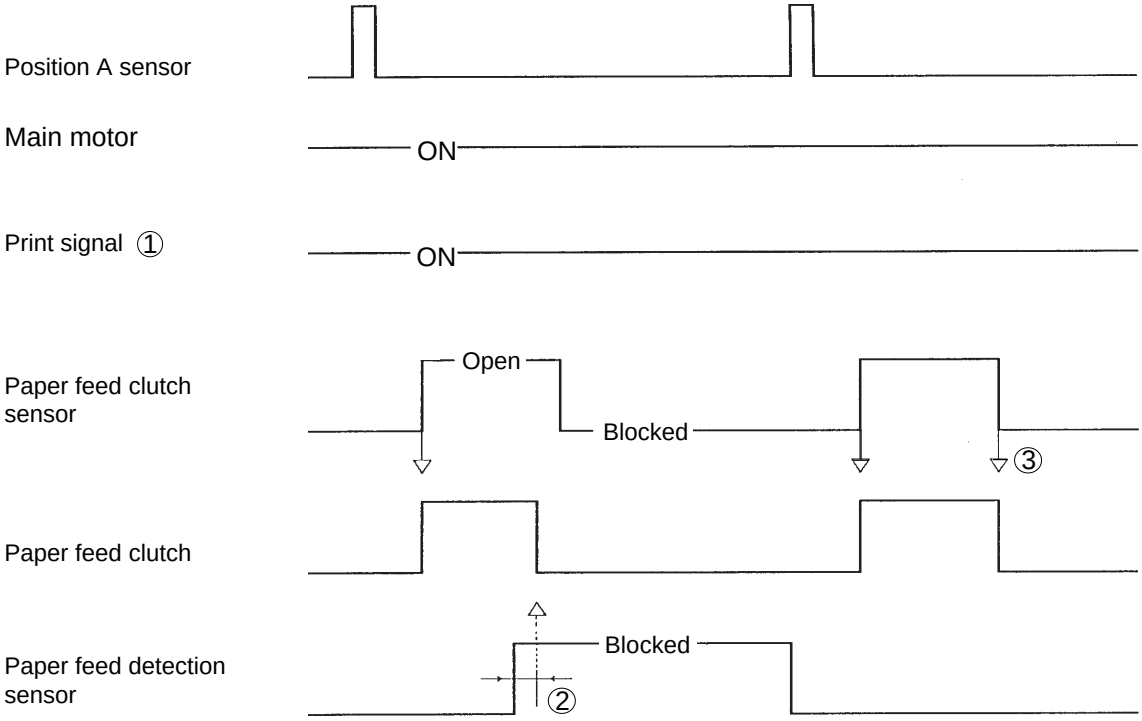


THEORY OF OPERATION

Test Mode No. 24 Paper feed clutch sensor:
– Short interval beeps when light path is blocked.
No. 25 Paper feed detection sensor
– Short interval beeps when light path is blocked.
No. 67 Paper feed clutch(activated at Paper feed clutch sensor ON)

-Timing Chart -

First Paper Feed Rollers Rotary System (During Printing)



① The Print signal starts the paper feed operation. If the light path of the Paper feed clutch sensor is opened while the Print signal is ON , the Paper feed clutch is engaged.
② After the Paper feed detection sensor detects the leading edge of a sheet, the Paper feed clutch is disengaged.
The OFF timing of the Paper feed clutch can be changed by setting of the paper type in the user mode and setting of the Test mode.
③ When the light path of the Paper feed clutch sensor is blocked, the Paper feed clutch is disengaged.

- **The conditions for the Paper feed clutch's engagement**
  (All of the following three conditions are requisite.)
  1. The Print signal is output (ON).
  2. The light path of the Paper feed clutch sensor is opened.
  3. The Stack paper feed sw is not actuated ON.

- **The conditions for the Paper feed clutch's disengagement**
  (Any one of the following four conditions is enough.)
  1. The Print signal is not output (OFF).
  2. The Paper feed detection sensor detects the leading edge of a sheet.
  3. The light path of the Paper feed clutch sensor is blocked.
  4. The Stack paper feed sw is actuated ON.

LED P-IN Paper feed detection sensor
– Lights up when light path is blocked.

8. First Paper Feed Rollers Rotary System (Activate by Drum angle)

- Basic

The Scraper and Pickup rollers are driven by the Paper feed clutch.

- Paper Feed Clutch

When the Main motor activates, the Drum rotates in the clockwise deirection (looking from back of the machine).
The Paper feed clutch activates at a certain Drum angle from the Position-A.
This Drum angle is determined by the count signal from the motor encoder sensor.
The clutch is released as the Drum rotates for a certain set degrees after the Paper sensor detects incoming paper.

- Transmission of Rotation Power

The Paper feed clutch is driven by the Main belt.
When the Paper feed clutch is activated, clutch components are engaged by the electromagnet, transmitting the rotation of the Main belt to the Pickup roller via the Pickup roller shaft.
The Pickup and Scraper rollers drive paper to the second paper feed section.

- Prevention of Brake Effect by Pickup and Scraper Rollers

The Pickup and Scraper rollers have one-way bearings built-in.
The one-way bearings allow the paper to feed into the second paper feed section freely.

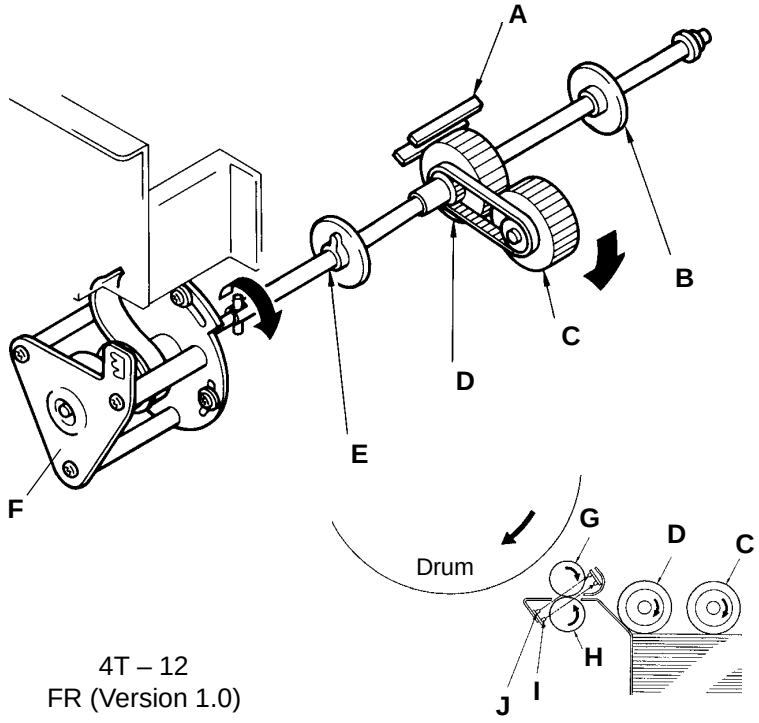
- Paper Feed Detection Sensor

To monitor the timing of paper transfer to the second paper feed section, a photo sensor, i.e. Paper feed detection sensor, is installed before the Guide roller.
When the Paper feed detection sensor detects paper, the paper feed clutch is disengaged a preset period later and the first paper feed operation is completed.
At this time, the leading edge of the paper comes into contact with the guide and timing rollers to sag. In order to cause the paper to sag at a constant rate before second paper feed starts, even if a printing speed changes, the OFF timing of the paper feed clutch is changed depending on the printing speed and the type of printing paper used.(Note 1)
If the Drum rotates 155° from 0° position before the Paper feed detection sensor detects paper, the paper feed clutch is disengaged at once to end the first paper feed operation even though the Paper feed detection sensor has not detected paper.

[Note 1]

The paper sag rate can be adjusted depending on setting of the paper in the user mode and the paper feed clutch OFF delay time of the Memory switch(Test mode).

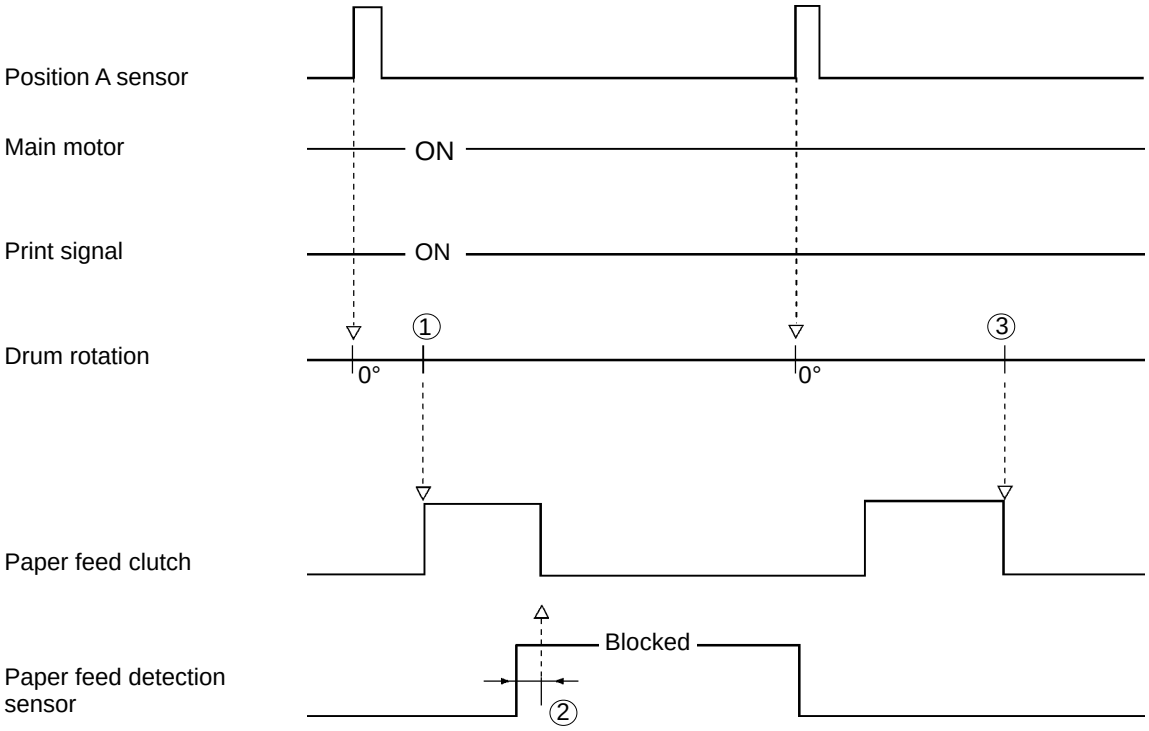
A: Paper sensor PCBs
B: Paper guide roller
C: Scraper roller
D: Pickup roller
E: Pickup roller shaft
F: Paper feed clutch
G: Guide roller
H: Timing roller
I: Paper feed detection sensor
J: Paper sensor



Test Mode No. 25 Paper feed detection sensor
– Short interval beeps when light path is blocked.
No. 67 Paper feed clutch

-Timing Chart -

First Paper Feed Rollers Rotary System (During Printing)



① The Paper feed clutch activates each time the Drum rotates 32° from the 0° position.
② After the Paper feed detection sensor detects the leading edge of a sheet, the Paper feed clutch is disengaged.
Paper feed clutch OFF Timing can be adjusted by Memory Switch (Test Mode).
③ The Paper feed clutch is deactivated when the Drum rotates 155° from the 0° position.

- **The conditions for the Paper feed clutch's engagement**
  (All of the following three conditions are requisite.)
  1. The Print signal is output (ON).
  2. The Drum rotates 32° from the 0° position.
  3. The Stack paper feed sw is not actuated ON.

- **The conditions for the Paper feed clutch's disengagement**
  (Any one of the following four conditions is enough.)
  1. The Print signal is not output (OFF).
  2. The Paper feed detection sensor detects the leading edge of a sheet.
  3. The Drum rotates 155° from the 0° position.
  4. The Stack paper feed sw is actuated ON.

9. Paper Pickup System

Feeding

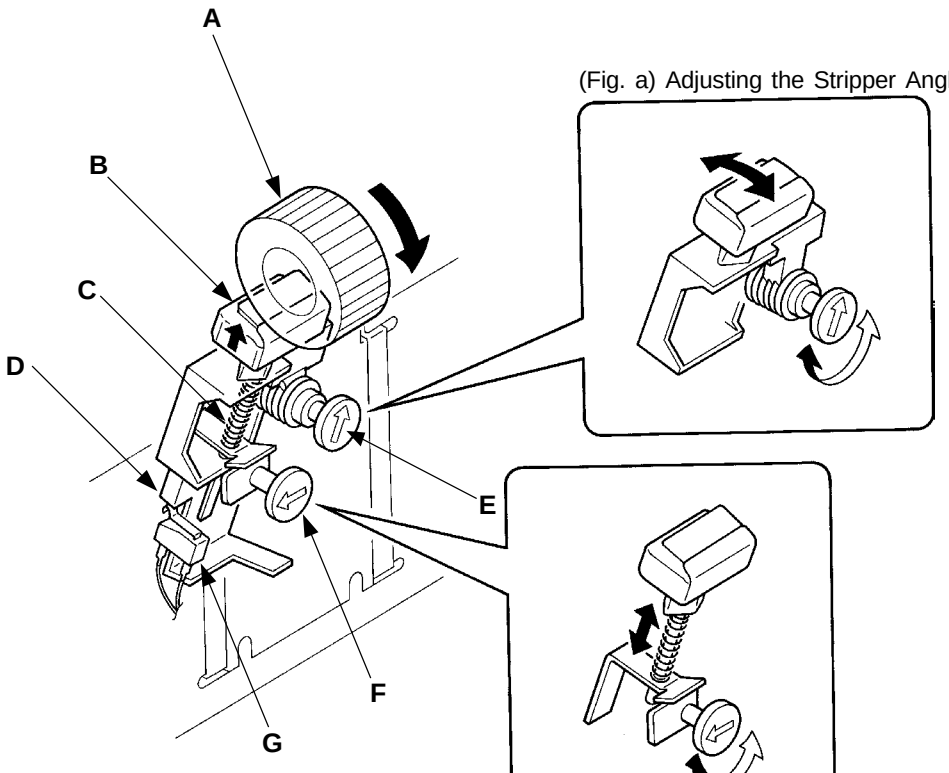
- The papers on the Paper feed tray are fed by the Scraper roller, in several layers, in between the Pickup roller and Stripper plate.

Pick-up

- The top sheet is separated from the rest by the Pickup roller and Stripper plate.
- The Stripper plates is pushed against the Pickup roller by the Stripper spring to provide resistance against paper feed, by which only a single sheet of paper is fed from the paper stack.
- The Stripper unit has Pressure adjust dial and Angle adjust dial which changes the stripper pressure against paper feed.

- Detection of Stack Paper Feed

If multiple sheets of paper are fed, the stripper plate is pushed down, causing the switch plate to contact the actuator of the Stack paper feed switch.
When the Stack paper feed switch is pressed, the Paper feed clutch is disengaged to stop feeding paper.



(Fig. a) Adjusting the Stripper Angle

(Fig. b) Adjusting the Stripper Pressure

A: Pick-up Roller
B: Stripper Pad
C: Stripper Spring
D: Actuator Plate
E: Stripper Angle Adjustment Dial
F: Stripper Pressure Adjustment Dial
G: Stacker Paper Feed Switch

Test Mode No. 102 Elevator operation
No. 2 Paper size det. sensor
– Short interval beeps when reflected light detected.
No. 40 Paper feed safty switch
– Short interval beeps when released.

REMOVAL & ASSEMBLY

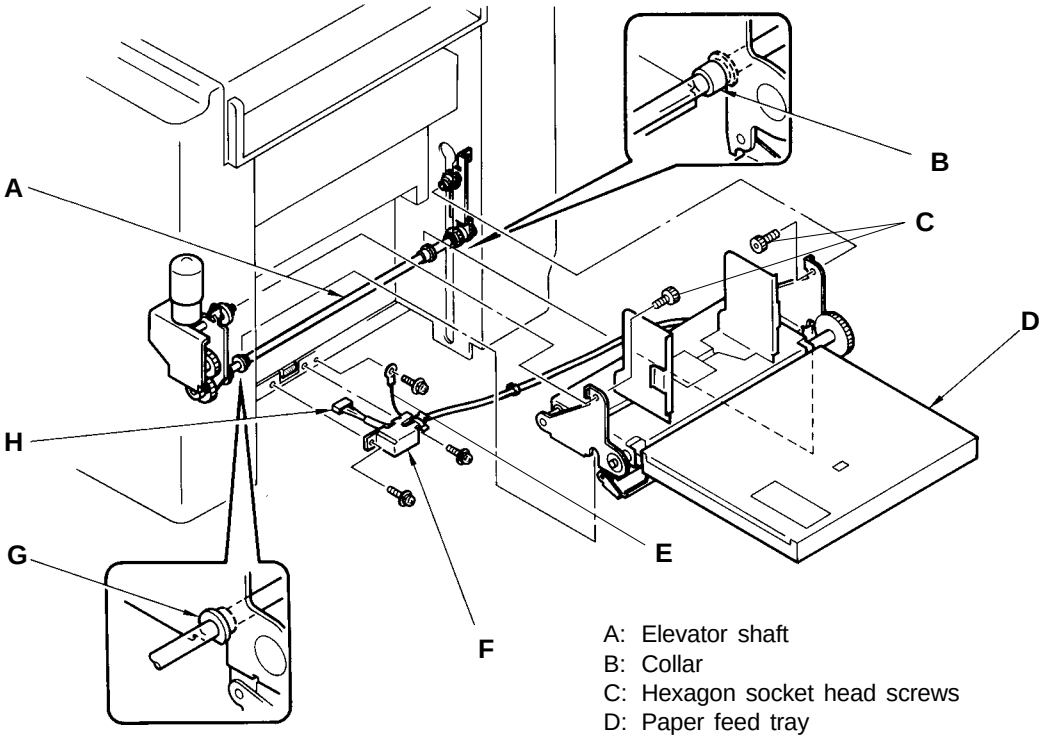
1. Paper Feed Tray Unit

< Removal Procedure >

1. Select Test mode **No. 102**.
   Press the Paper feed tray down button to raise the tray about a third way up.
   Turn OFF the power.
   In order to remove the connector cover under the paper feed tray. Move the paper feed tray down to the lowest position when removing the paper guide plate
2. Remove the screw securing the ground wire on the frame under the Stripper unit.
3. Remove two screws holding the Connector cover located under the Stripper unit.
4. Pull out the wire harness until the connector comes out from under the Stripper unit. Disconnect the connector.
5. Remove two hexagon socket head screws and dismount the Paper feed tray unit.

- Precautions in Assembly -

- Make sure to mount the Paper feed tray firmly on collars on both sides.
- If the connector of the wire harness is disconnected, the machine assumes the Paper feed tray safety sw (bottom) is not actuated ON and prevents the Elevator motor from operating.



A: Elevator shaft
B: Collar
C: Hexagon socket head screws
D: Paper feed tray
E: Ground wires
F: Connector cover
G: Collar
H: Connector

2. Paper Size Potentiometer

< Removal Procedure >

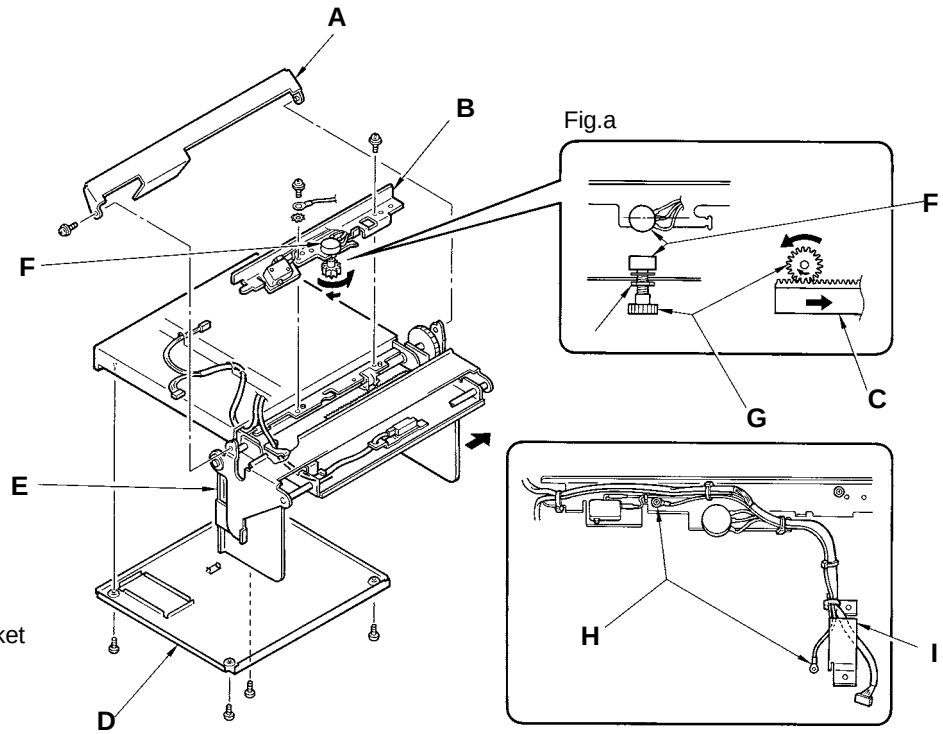
1. Remove the Paper feed tray unit.
2. Turn the tray upside down and remove the Actuator plate.
3. Remove two mounting screws on the Size VR bracket, and remove the bracket.
   A Ground wire and a washer will be removed at the same time.
4. Loosen the nut on the Paper size potentiometer, and remove the potentiometer together with the Wire harness assembly attached.
   The potentiometer is replaced together with the Wire harness assembly.
5. Remove four screws on the Feed board and remove the board.
   Disconnect the wire harness connector of the Paper size sensor.

- Precautions in Assembly -

1) Attach the Paper size potentiometer to the size VR bracket. When this is done, catch it with a hexagonal nut and washer. The meter terminals should be set parallel to the size VR bracket.(See Fig. a)
2) Fit the size gear into the rotary shaft of the Paper size potentiometer(be careful not to lose a parallel pin).
3) When attaching the size VR bracket to the Paper feed tray body, open the Side guide fully, turn the size gear of the Paper size potentiometer fully in the opening direction, and return it by about 9 threads to engage it with the Slide rack.

- Adjustments and checks after installation

- Paper Width Data (page 4A-1).



A: Actuator plate
B: Size VR bracket
C: Slide rack
D: Feed board
E: Side guide
F: Paper size potentiometer
G: Size gear
H: Ground wire
I: Connector cover

3. Paper Feed Tray Slide Motor, Paper Feed Tray Safety SW, Paper Feed Tray Position Sensor (A3 model)

< Removal Procedure>

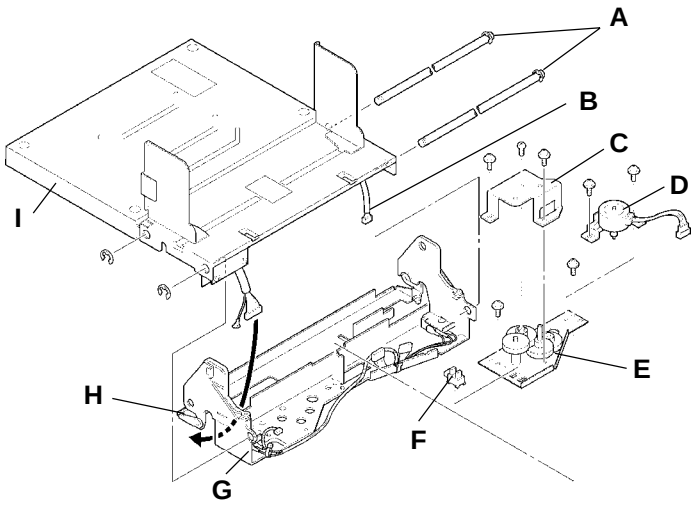
1. Remove the Paper feed tray from the main body(page 4R-1).
2. Remove a mounting screw of the actuator plate of the paper feed tray safety switch to remove the actuator plate.
3. Remove the E-ring each from one side of the Paper feed tray shafts,draw them out from the paper feed tray, and separate the paper feed tray(Upper) and paper feed tray(Lower), and unplug a connector.
4. Remove three mounting screws of the Gear cover and remove the cover.

Paper Feed Tray Slide Motor

5. Remove two mounting screws on the Paper feed tray slide motor and remove the motor.

Paper Feed Tray Position Sensor

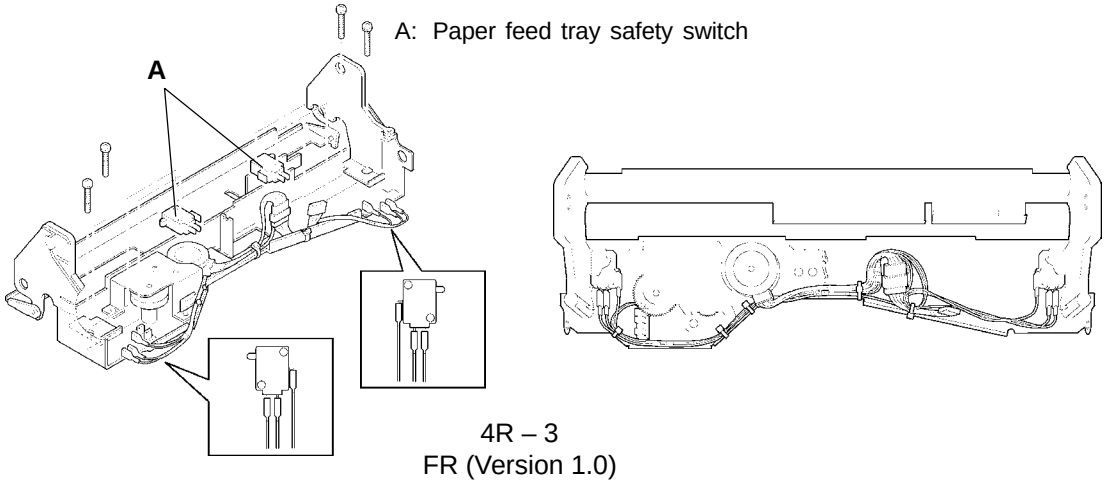
5. Remove two mounting screws on the Drive gear bracket and remove the bracket with the position sensor.
6. From the back of the Drive gear bracket, detach the fingers of the positon sensor from the bracket.



A: Paper feed tray shaft
B: Connector
C: Gear cover
D: Paper feed tray slide motor
E: Drive gear bracket
F: Paper feed tray position sensor
G: Paper feed tray(Lower)
H: Actuator plate
I: Paper feed tray(Upper)

Paper Feed Tray Safety Switch

4. Remove the two setscrews each of the safety switches attached to the left and right of the paper feed tray(Lower) to detach the switches.
5. See the figure below for the wiring of the safety switches.



A: Paper feed tray safety switch

4. Scraper Unit

< Removal Procedure >

1. Move the paper feed tray to the lowest position, turn off the power, and remove the scraper cover.
2. Lower the Paper feed pressure adjustment lever and remove two mounting screws on the Paper feed cover.
   Disconnect a wire harness connector and remove the cover.
3. Remove the Lock ring from the right end of the Pickup roller shaft.
   Slide the unit to the right and unhook the left end of the shaft from the Paper feed clutch shaft.
   [IMPORTANT]
   Be careful not to damage the actuator of the Elevator upper limit sensor.
4. Remove the unit from the machine by bringing out the left end of the shaft first.
   [Note]
   If the paper guide rollers hit against the Upper limit sensor bracket during the removal, slide the Paper guide rollers.

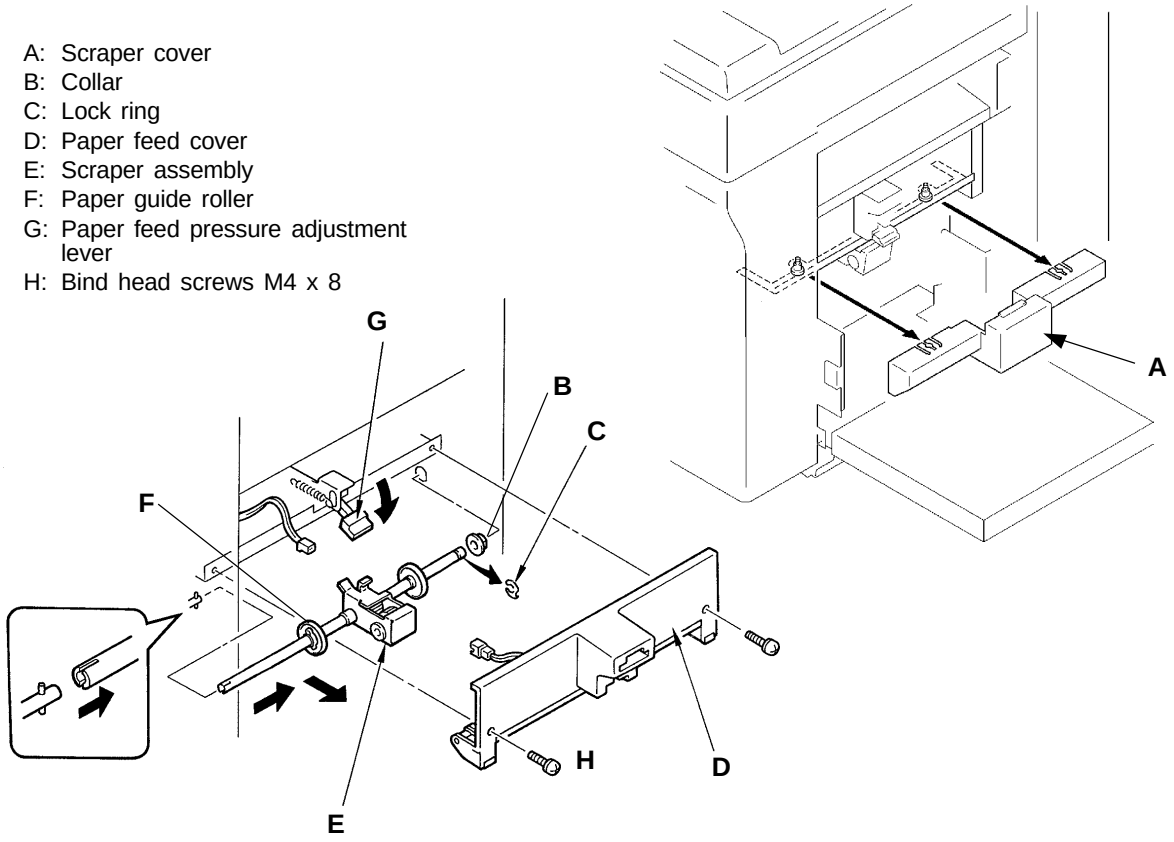
- Precaution in Removal -

- Be careful not to drop and lose the collar when removing the Scraper unit.

- Precautions in Assembly -

- Be careful not to damage the actuator of the Elevator upper limit sensor.
- Be careful not to break the Scraper cover.

A: Scraper cover
B: Collar
C: Lock ring
D: Paper feed cover
E: Scraper assembly
F: Paper guide roller
G: Paper feed pressure adjustment lever
H: Bind head screws M4 x 8



5. Scraper and Pickup Rollers

< Removal Procedure >

Scraper roller

1. Remove two Lock rings and collars from the ends of the Scraper roller shaft.
2. Remove the Scraper roller from the shaft.

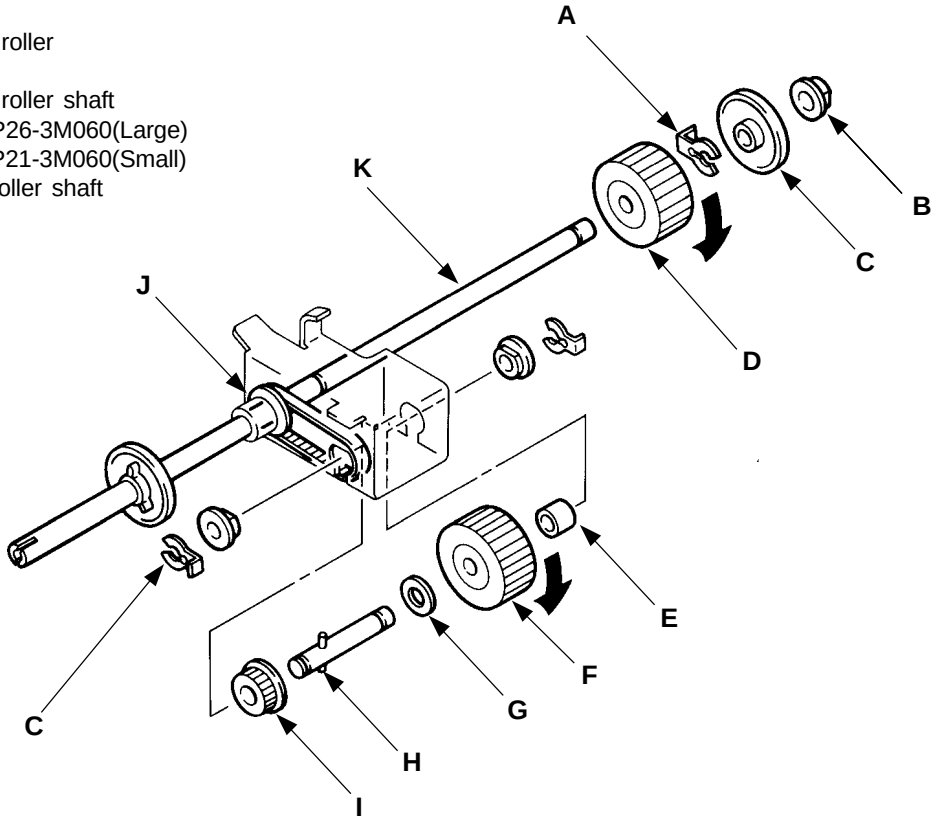
Pickup roller

1. Move the paper feed tray to the lowest position, turn off the power, and remove the scraper assembly(see the previous page).
2. Slide out the Paper guide roller on the right half of the Pickup roller shaft.
3. Remove the Lock ring on the right side of the Pickup roller and remove the roller from the shaft.

- Precautions in Assembly -

- As one-way bearings are built into the Scraper and Pickup rollers, be careful of the rotational direction upon installation.
  If the rollers are installed on the shafts in the wrong way, the rollers will not rotate when the Pickup roller shaft is turned.
  Check that the rollers rotate freely if turned towards the paper feed direction (the direction indicated by arrows in the figure below).

A: Lock ring
B: Collar(thick)
C: Paper guide roller
D: Pickup roller
E: Collar
F: Scraper roller
G: Washer
H: Scraper roller shaft
I: Pulley; P26-3M060(Large)
J: Pulley; P21-3M060(Small)
K: Pickup roller shaft



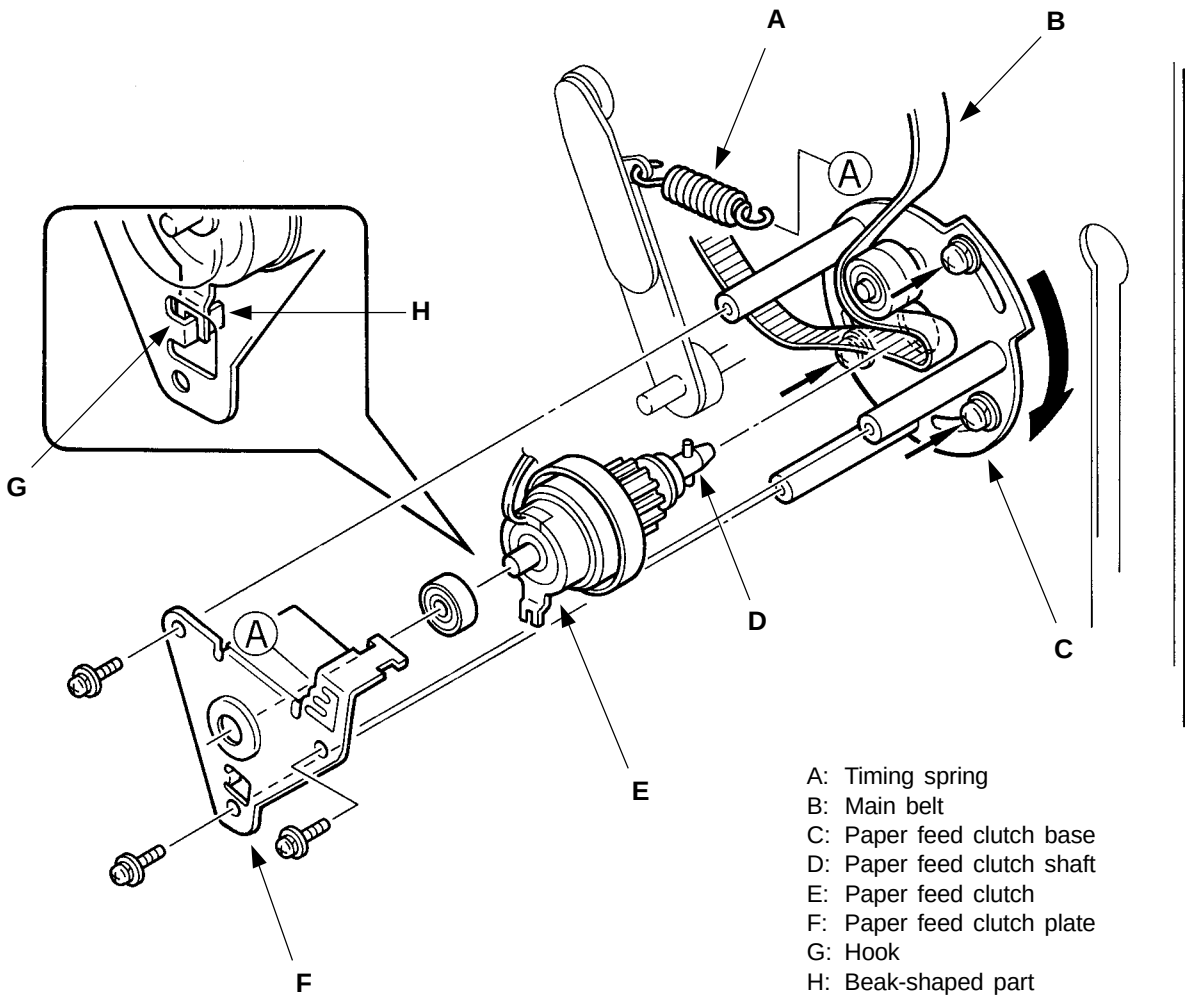
6. Paper Feed Clutch Ass'y

< Removal Procedure >

1. Turn OFF the power and remove the Back cover and scraper unit.
2. Remove the Timing spring.
3. Loosen three mounting screws on the Paper feed clutch base and turn the Paper feed clutch unit clockwise to release the tension of the Main belt.
4. Remove three mounting screws on the Paper feed clutch plate and remove the plate.
5. Pull the Paper feed clutch ass'y toward you and disengage the Paper feed clutch shaft from the Pickup roller shaft.
6. Disconnect the connector of the Paper feed clutch, disengage the Main belt from the Paper feed clutch pulley and remove the Paper feed clutch ass'y by pulling it further toward you.

- Precautions in Assembly -

- Make sure to engage the beak-shaped part of the Paper feed clutch with the hook of the Paper feed clutch plate.



A: Timing spring
B: Main belt
C: Paper feed clutch base
D: Paper feed clutch shaft
E: Paper feed clutch
F: Paper feed clutch plate
G: Hook
H: Beak-shaped part

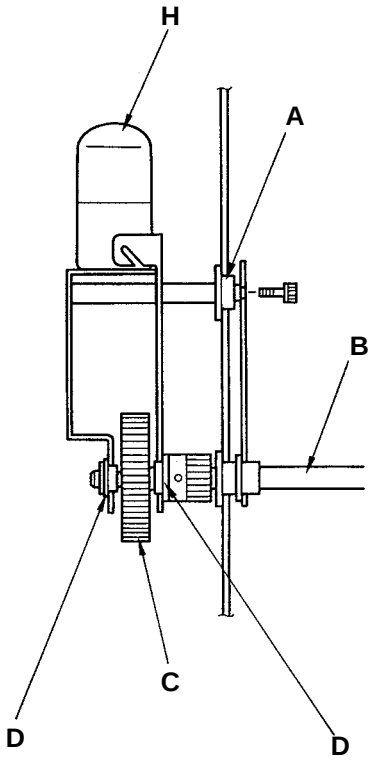
7. Elevator Motor Unit

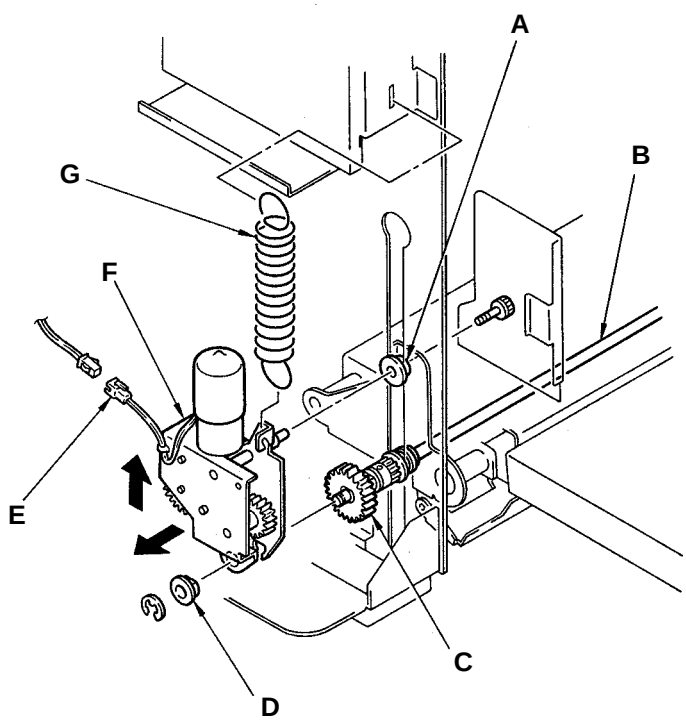
< Removal Procedure >

1. Raise the Paper feed tray a little (by approx. 5mm) if it is positioned at the bottom, using Test mode **No.102**.
   [Note]
   In case the Elevator motor doesn't operate, raise the tray by manually rotating the worm gear of the Elevator motor.
2. Remove the Carrying grasp (a white plastic box) from the Bottom plate (left) by removing a tapping screw.
3. Remove the Elevator spring and the hexagon socket head screw securing the Paper feed tray unit on the Drive base side.
4. Disconnect the connector of the Elevator motor.
5. Remove the E-ring securing the collar at the end of the Elevator shaft and remove the collar.
6. Pull the Elevator motor unit toward you and lift it up off the Elevator shaft.

- Precautions in Assembly -

- Always put white grease on plastic gears in the Elevator motor unit and the Elevator gear after assembly.
- Position the Elevator shaft a little up before starting assembly.
- Put the Elevator collar on the upper shaft of the Elevator motor unit.





A: Elevator collar
B: Elevator shaft
C: Elevator gear
D: Collar
E: Connector
F: Elevator motor unit
G: Elevator spring
H: Elevator motor

8. Stripper Unit

Removal

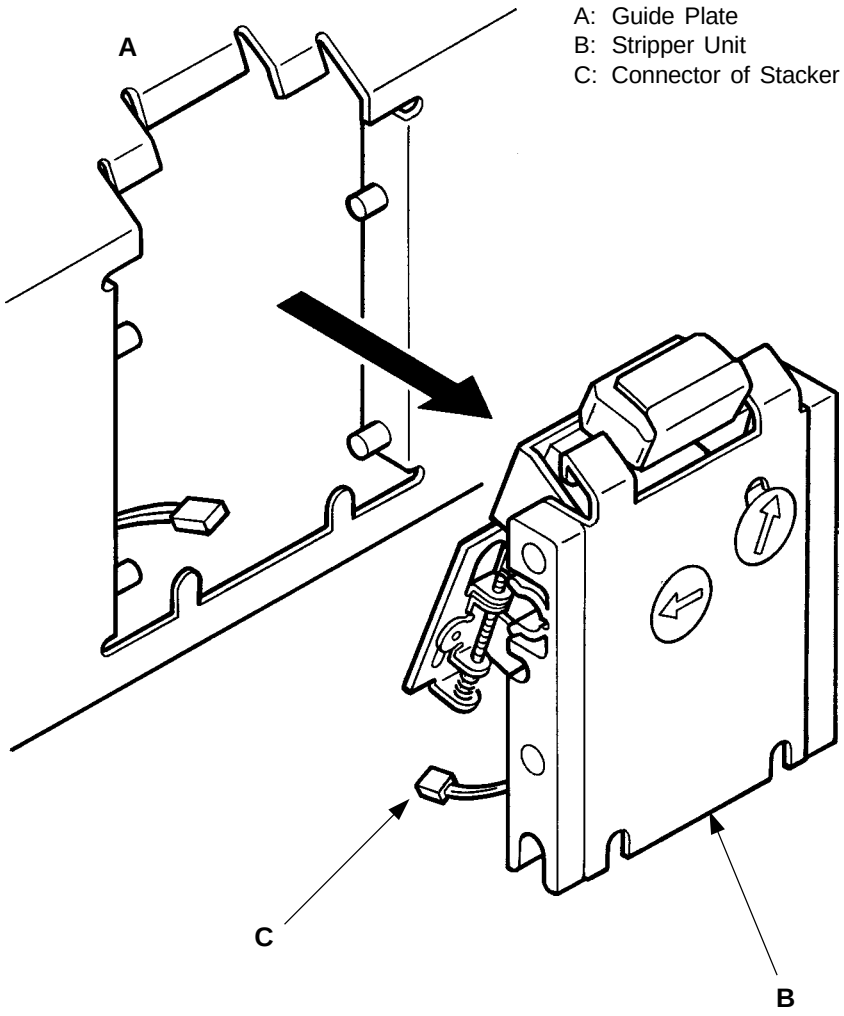
1. Move the paper feed tray down to the lowest position and turn off the power.
2. Set a finger on the upper part of the stripper unit and pull it out to the near side.
3. Disconnect the connector of the Stack paper feed switch hidden behind the guide plate and remove the stripper unit.

Precaution in Assembly

- With the stripper assembly pushed inside, set onto the guide plate.
- Remember to insert the connector of the Stack paper feed switch.

Adjustment after Assembly

- Stripper Pad Pressure. (page 4A-3)
- Position of the Stack Paper Feed switch (page 4A-4)



A: Guide Plate
B: Stripper Unit
C: Connector of Stacker Paper Feed SW

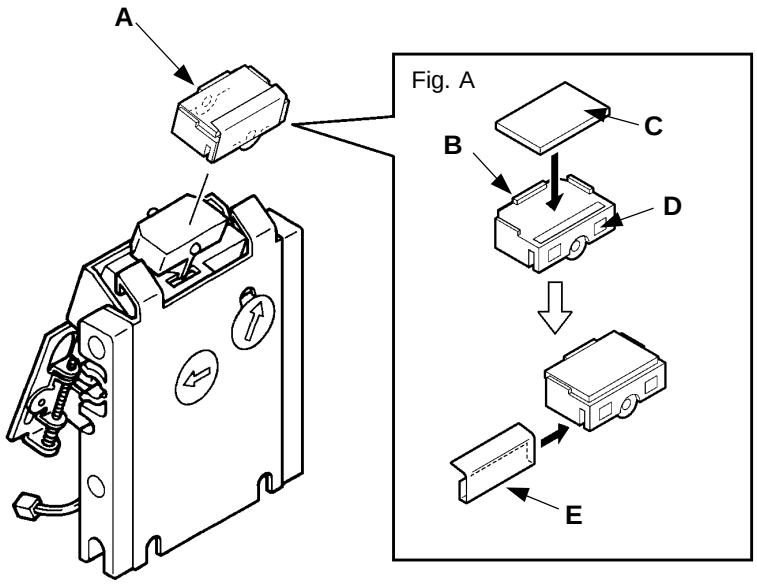
9. Stripper Pad

Removal

1. Move the paper feed tray down to the lowest position, turn off the power, and remove the stripper unit.
2. Raise the stripper pad manually and remove it.

Precautions in Assembly

- There are two kinds of stripper pads. Choose a proper one according to the user's paper type.



A: Stripper Assembly
B: Convex Part
C: Stripper sheet
D: Stripper pad
E: Stripper cover

Normal Friction	High Friction
Yellow	Gray
Stripper pad; 70	Stripper Pad; U

MEMO

ADJUSTMENT

1. Paper Width Data

1. Set the A4-size paper on the paper feed tray and adjust the Paper side guides properly to the paper size.
2. Start up the Test Mode No. 222(Memory switch) and make sure that the paper size potentiometer displays “210 mm.”
3. If not displaying “210 mm,” select the Test Mode No. 222(Memory switch) to make adjustment.
4. Cancel the Test Mode(Memory switch) to return to the normal screen.
5. Set the standard paper on the paper feed tray and make sure that a correct paper size is displayed.

Precautions for Adjustment

- If the paper size potentiometer does not display “210 mm” after adjustment in the Test Mode(Memory switch), its mounting position is dislocated. Attach it properly.
  If the display is unstable or does not change by moving the Paper side guides, it is likely that the connector of the paper feed tray and that of the PCB may be disconnected.

Results of Misadjustment

If the reading width of the paper size potentiometer is incorrect, the proper paper size will not be displayed even if the standard paper is set.

Adjustment of Test Mode(Memory Switch) No. 222

Memory SW	9	A	B	C	D	E	F	0	1	2	3	4
Adjustment Amount(mm)	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4

5	6	7	8
+5	+6	+7	+8

Decrease ◄——— Adjustment Amount ———► Increase

2. Position of Elevator Upper Limit Sensor

1. Remove paper from the Paper feed tray.
2. Switch the paper feed pressure adjustment lever to “NORMAL.”
3. Enter Test mode **No.102**.
4. Press the Elevator down botton until the Paper feed tray elevates and stops at the top position.
5. Confirm that the gap between the Pickup roller and the Paper feed tray is **1.5±0.5mm**.
6. If the measurement is off, loosen the screw holding the Upper limit sensor bracket and move the bracket up or down to adjust the top position of the Paper feed tray.

- Precautions in Adjustment -

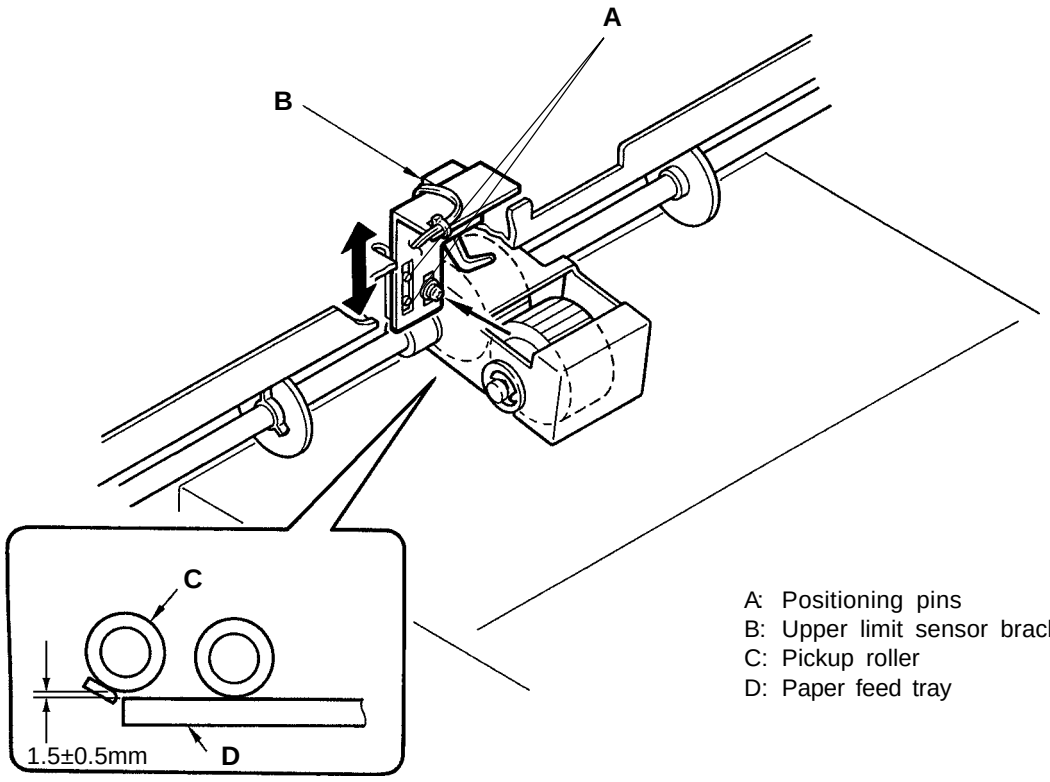
- Do not confuse the Pickup roller with the Scraper roller when measuring the space.
- The upper-limit stop position of the paper feed tray changes slightly by switching the paper feed pressure adjustment lever.(If the lever is switched to “CARD,” the upper-limit stop position of the paper feed tray will be raised slightly)

- Checking after Adjustment -

- Check the actual paper feed state. If stacked paper or no paper is fed, make fine adjustment of the elevator upper-limit sensor’s position as required, as well as adjustment of the stripper pressure and angle of the stripper pad.

- Results of Misadjustment -

- If the Upper limit sensor is set too high;
  the paper feed pressure becomes strong and multiple sheet feedings will occur.
- If the Upper limit sensor is set too low;
  the paper feed pressure becomes weak and paper will skip or misfeed.



A: Positioning pins
B: Upper limit sensor bracket
C: Pickup roller
D: Paper feed tray

3. Stripper Pad Pressure

1. Switch the paper feed pressure adjustment lever according to the type of paper and print.
2. When stacked paper or no paper is fed, adjust the stripper angle or pressure of the stripper pad.

(1) When stacked paper is fed

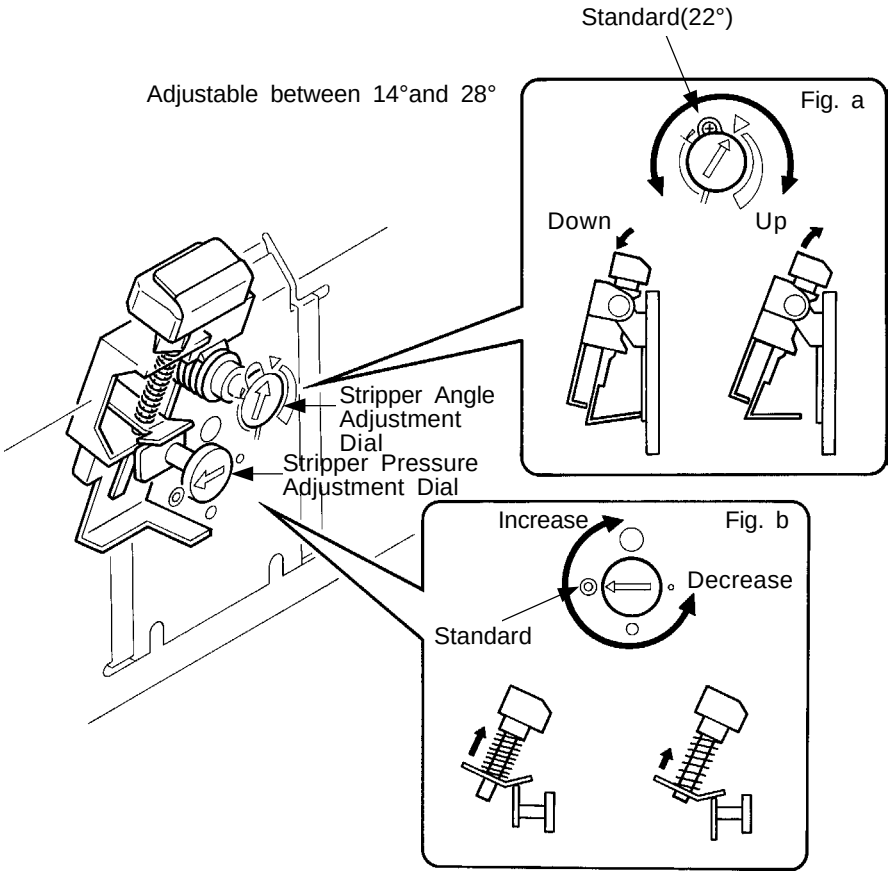
- Turn the stripper angle adjustment dial in the clockwise direction to increase the angle of the stripper pad.
- Turn the stripper pressure adjustment dial in the clockwise direction to increase the stripper pressure.

(2) When no paper is fed

- Turn the stripper angle adjustment dial in the counterclockwise direction to decrease the angle of the stripper pad.
- Turn the stripper pressure adjustment dial in the counterclockwise direction to decrease the stripper pressure.

Precautions for Adjustment

- If stacked paper or no paper feed cannot be corrected by adjusting the angle or pressure of the stripper pad, replace the stripper pad with another type.



4. Position of Stack Paper Feed Switch

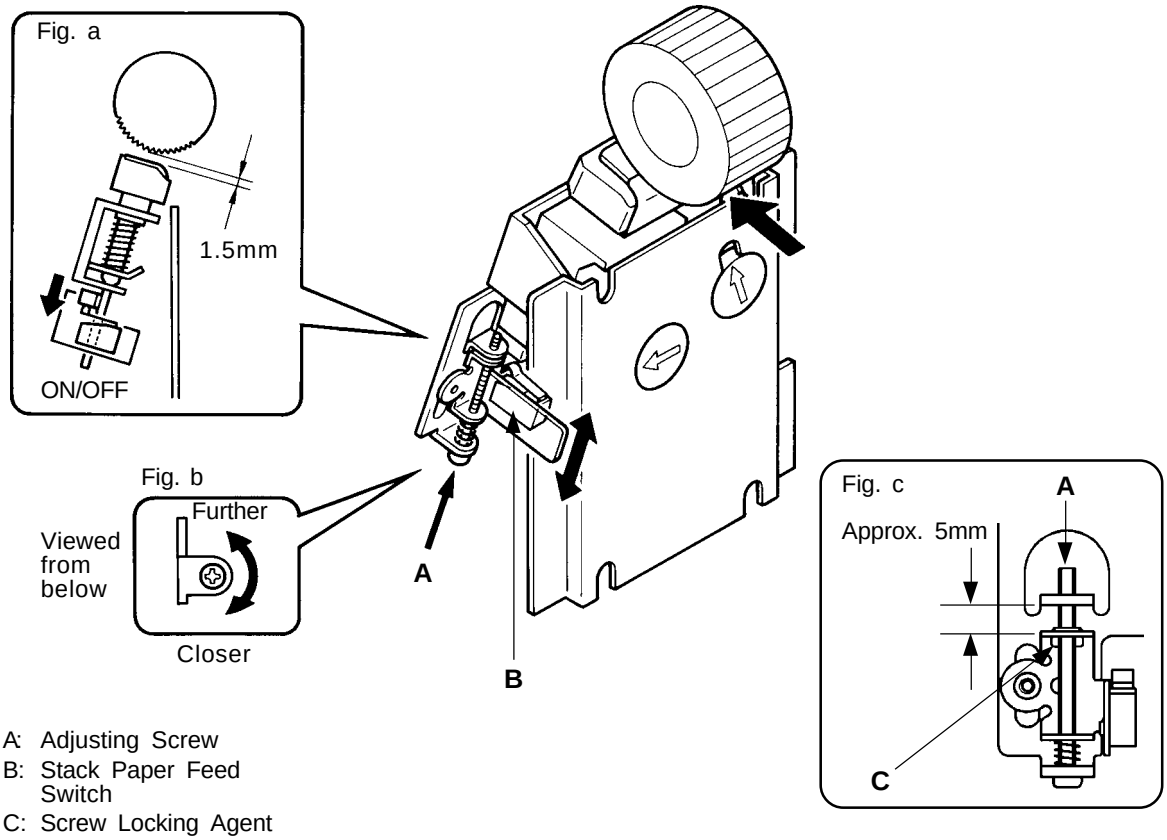
1. With the stripper unit attached to the main body, push down the Stripper pad slowly with a finger. After pushing them down about 1.5 mm, make sure that the Stack Paper Feed switch is pressed and clicks(Fig. a)
2. If other than the specified value, remove the stripper unit.
3. Turn the adjusting screw to make adjustment.
   - Viewing the adjusting screw from below, turning it counterclockwise causes the Stack Paper Feed switch to approach the actuator plate, and turning it clockwise causes it to go away.
   - One turn of the adjusting screw makes a change of about 0.5 mm.
   - The specified value is almost obtained by setting the distance marked with ★ to approx. 5 mm shown in Fig. C.
4. Finally, apply a screw locking agent to the adjusting screw(Fig. c) and attach to the main body.

- Precautions for Checking and Adjustment

- If the switch sound cannot be easily heard, turn on the Test Mode No. 67(paper feed clutch), press the SW1 of the System PCB to rotate the main motor at the slit section of the P-disc to check whether the paper feed clutch is activated or not.

- Results of Misadjustment -

- If the Stack Paper Feed switch is too close to the actuator plate, the switch will be pressed to turn off the paper feed clutch during printing, and if it has been pressed from the beginning, the paper feed clutch will not be turned on at all and “PAPER MISFEED CHECK PAPER FEED AREA AND PRESS ALL RESET KEY” will be displayed.
- If the switch is too far on the contrary, the paper feed clutch will not be turned off even if multiple sheets are fed at once, and the paper will jam in the secondary paper feed section, locking the drive unit or deforming the guide plate.



A: Adjusting Screw
B: Stack Paper Feed Switch
C: Screw Locking Agent

5. Position of P Disc (Start-time of First Paper Feed)

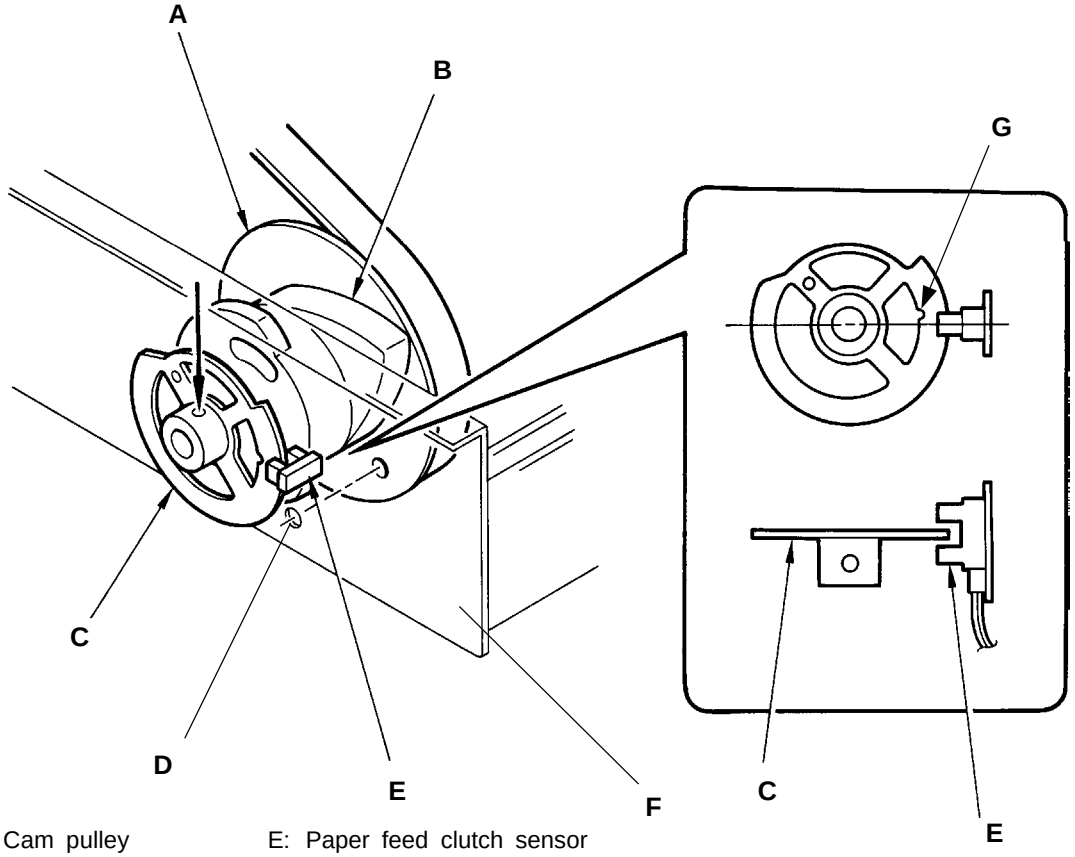
1. Check that the vertical print position is at the center and the Drum at the home position.
2. Check if the alignment notch of the P disc is positioned on a level with the top corner of the Paper feed cluth sensor as shown in the figure below.
3. If not, first check if the hole on the Main shaft face plate is aligned with the counterpart on the Cam pulley.
   If it is not aligned, adjust the arrangement of the Cam pulley.
4. If the alignment notch of the P disc is still not correctly positioned after confirming the hole alignment for the Cam pulley, loosen the allen screw securing the P disc and turn the P disc so that the alignment notch is positioned on a level with the top corner of the Paper feed clutch sensor.
5. Tighten the allen screw inside the P disc.
   [IMPORTANT]
   Secure the P disc so that it is positioned in the middle of the Paper feed clutch sensor as shown in the figure below.

- Precautions in Adjustment -

- Make sure that the P disc doesn't get contact with the inner surface of the Paper feed clutch sensor at any position by rotating the P disc with a press of SW1 on the System PCB.

- Results of Misadjustment -

- If the P disc is incorrectly positioned;
  paper will not feed correctly, causing paper feed errors or making print position unstable.



A: Cam pulley
B: Guide roller cam
C: P disc
D: Alignment hole
E: Paper feed clutch sensor
F: Main shaft face plate
G: Alignment notch

6. Paper Feed Mode (Paper Feed Clutch OFF Timing)

1. In the User Mode No. 04, adjust setting to the paper used and print.
2. If the paper is not fed smoothly during printing, adjust the paper feed clutch OFF delay time with the Memory switch(Test Mode) so that the paper will sag adequately in first paper feed.

- Results of Misadjustment

- If the paper feed clutch delay time is too late, a first paper feed rate will increase, resulting in breakage of the paper, or the end of the paper will be returned to the first paper feed side at second paper feed and “jams” without implementing second paper feed.
- If the paper feed clutch delay time is too early on the contrary, the paper will not sag properly, likely to result in “print registration problem” or “paper jam.”

User Mode No. 04

User Mode
04. PEPER FEED MODE
STANDARD / CARD / THIN / CUSTOM
Item /+ - Select / Start

Memory Switch(Test Mode) No. 232/234/236/238/240 Paper Feed Clutch OFF Delay Time Adjustment

Memory SW	9	A	B	C	D	E	F	0	1	2	3	4
Adjustment Amount(mm)	-7	-6	-5	-4	-3	-2	-1	0	+3	+6	+9	+12
	5	6	7	8								
	+15	+18	+21	+24								

Decrease ◄——— Adjustment Amount ———► Increase

Test Mode

No.232 Paper Feed Clutch OFF Delay Time Setting: (STANDARD)
No.234 Paper Feed Clutch OFF Delay Time Setting: (CARD)
No.236 Paper Feed Clutch OFF Delay Time Setting: (THIN)
No.238 Paper Feed Clutch OFF Delay Time Setting: (CUSTOM)
No.240 Paper Feed Clutch OFF Delay Time Setting with Special Paper Unit

CHAPTER 5: SECOND PAPER FEED SECTION

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LED PSEN Paper sensor
– Lights up when light path is blocked.
Test Mode No. 6 Paper sensor
– Short interval beeps when light path is blocked.

THEORY OF OPERATION

1. Second Paper Feed System

- Rotation of Guide Roller

The Guide cam follower is shifted up and down on the Guide roller cam when the Main motor rotates.

When it follows the cam from the low point to the high one in the cam's rotation after a feeding sheet reach the Guide roller, the Sector gear is driven to rotate the Guide roller gear clockwise.

The Guide roller gear incorporates a one-way spring clutch to rotate the Guide roller only when the Guide roller gear is driven clockwise and not to transmit rotation to the Guide roller when the Guide roller gear rotates counter-clockwise.

- Rotation of Timing Roller

When the Timing roller is raised, the Gear B on the Timing roller shaft is engaged with the Gear A on the Guide roller shaft.

When the Guide roller is rotated, the Timing roller is simultaneously rotated via the Gears A and B to feed a sheet to the print area.

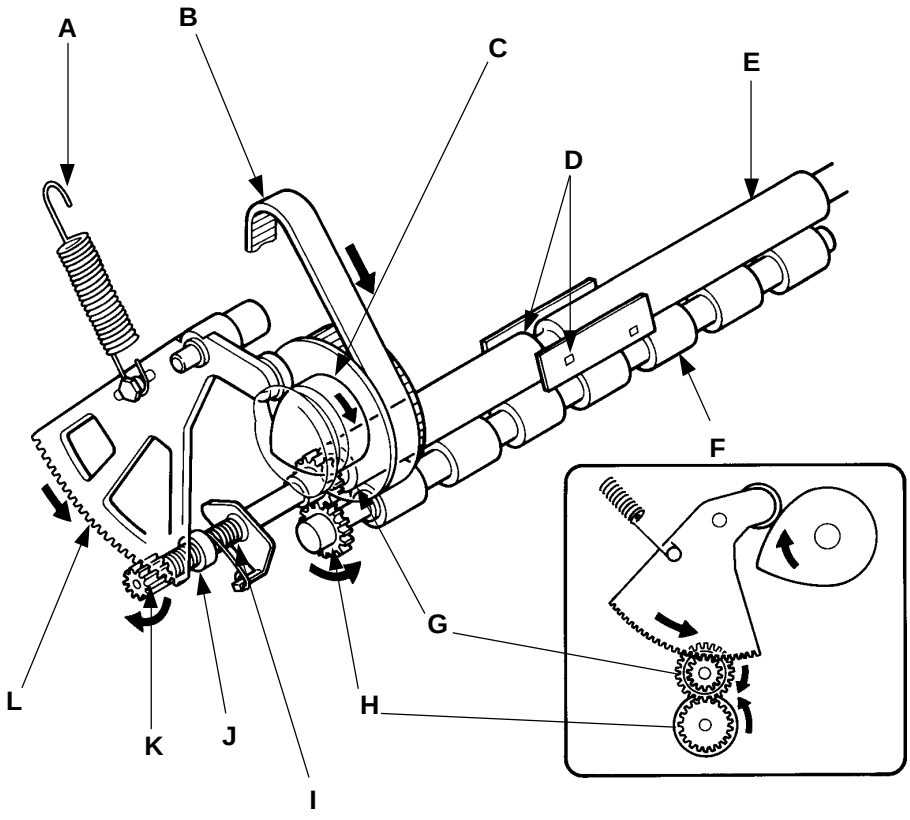
- Check of Paper Feed

The Paper sensor checks if a sheet is securely fed through the Guide and Timing rollers up to the print area.

- Function of Load Spring

The Load spring is put on the Guide roller shaft to prevent the roller from rotating when the rotation force is not transmitted to the roller by applying a load against rotation, which serves constant print position (registration).

A: Sector gear spring
B: Main belt
C: Guide roller cam
D: Paper sensor
E: Guide roller
F: Timing roller
G: Gear A
H: Gear B
I: Load spring
J: One-way spring
K: Guide roller gear
L: Sector gear



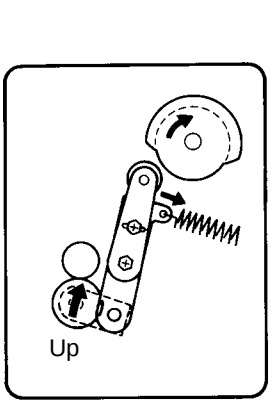
2. Timing Rollor Up Down System

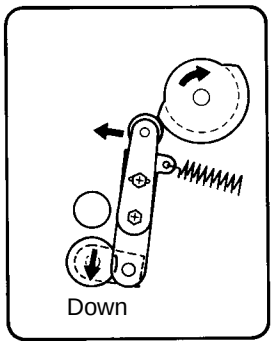
- Shift-up of Timing Roller

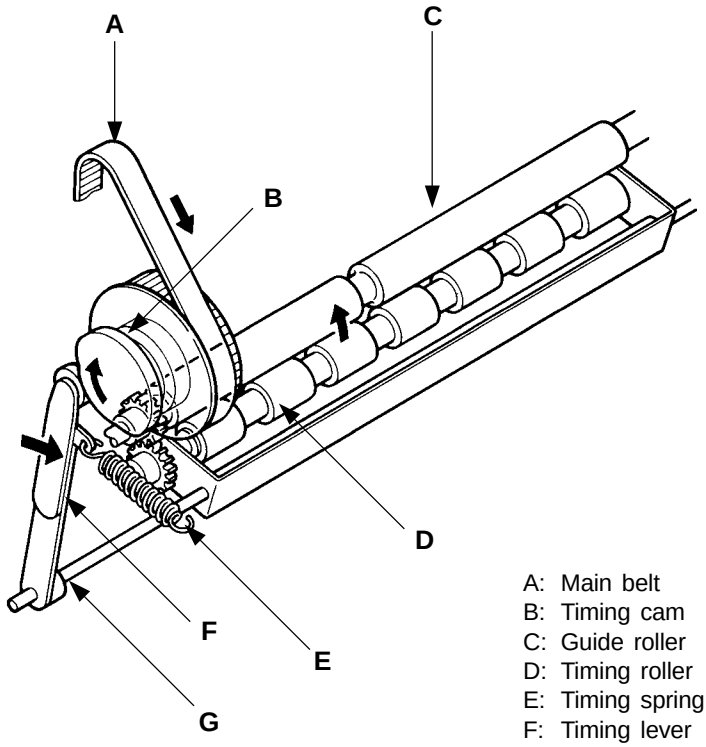
The Timing cam attached to the Cam pulley rotates clockwise when the Main motor rotates. As the Timing cam rotates, the Timing cam follower on the Timing lever, pressed against the cam by the Timing spring, follows the cam and is shifted up and down on the cam.
When it follows the cam from the high point to the low one in the cam's rotation while a sheet is picked up and fed in the first paper feed area, the Timing lever is driven to rotate the Timing roller shaft clockwise, raising the Timing roller mounted on the holder to the Guide roller.
The raised Timing roller is kept in contact with the Guide roller with sufficient pressure by the Timing lever spring.

- Shift-down of Timing Roller

When the Guide and Timing rollers finish rotating and the Timing cam follower follows the cam from the low point to the high one, the Timing lever is driven to rotate the Timing roller shaft counter-clockwise, lowering the Timing roller.
This mechanism prevents the back tension from being applied to the paper.







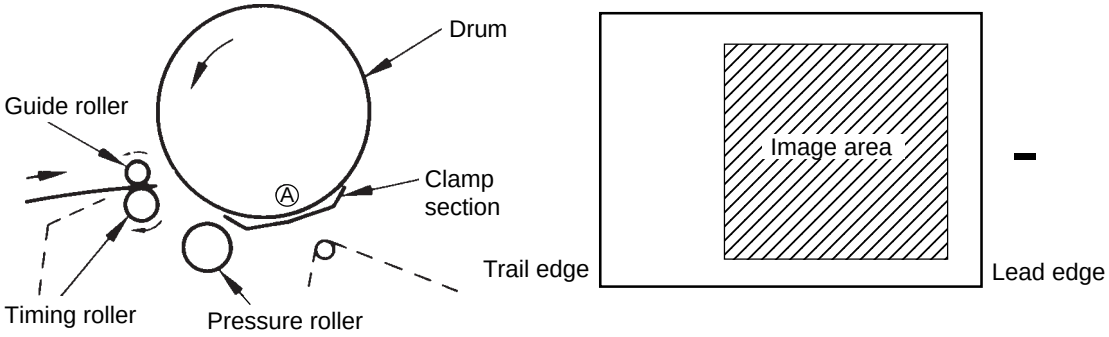
A: Main belt
B: Timing cam
C: Guide roller
D: Timing roller
E: Timing spring
F: Timing lever
G: Timing roller shaft

3. Vertical Position Control System

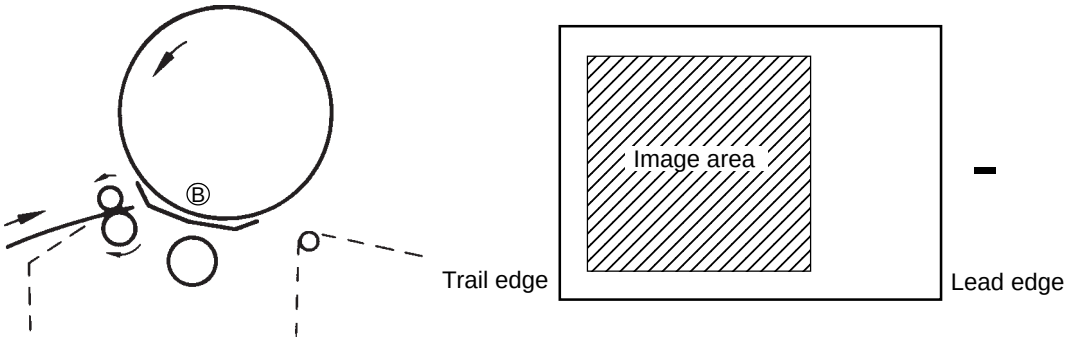
- Basic

When pressing the print position button on the operation panel, the Print positioning motor rotates and changes the vertical print position in steps on the printed copy to a maximum of ±**20mm**.(B4 models)

<1> Suppose the Guide roller starts rotating and feeding a sheet to the print area when the Clamp section on the Drum is rotated to point A in the figure.
In this case, the image area on printed copies is as shown in the figure below.



<2> Next suppose the Guide roller starts rotating and feeding a sheet to the print area when the Clamp section on the Drum is rotated to point B in the figure.
In this case, the sheet is fed earlier and the image area goes down to the bottom of printed copies as shown in the figure below.



The print position in the vertical direction is determined by the start time of the rotation of the Guide roller.

LED TEN Vertical centering sensor
– Lights up when light path is blocked
Test Mode No. 22 Vertical centering sensor
– Short interval beeps when light path is blocked

- Rotation of Print Positioning Motor

When the Print position button "DOWN" on the operation panel is pressed to shift down the image area on printed copies, the Print positioning motor rotates clockwise, causing the Slide shaft to rotate counter-clockwise via the Slide gear.

- Elevation of Slide Plate

By the rotation of the Slide shaft, the Slide shaft bracket, which is fixed to the Slide plate, is elevated to shift up the Slide plate.

- Movement of Main Belt

When the Slide plate is shifted up, the two Slide idlers, which are fixed to the Slide plate to provide tension on the Main belt, are also elevated. This loosens the tension of the Main belt on the upper idler and tightens it on the lower idler, causing the Main belt to move counter-clockwise.

- Rotation of Main Pulley

When the Main belt moves counter-clockwise, the Main pulley is rotated counter-clockwise and the Drum is as well rotated out of the home position.
With the cams and pulleys arranged as above, the Sector gear is started to move earlier, causing the Guide roller as well to start rotating earlier to feed paper to the print area earlier. As a result, the image area is shifted to the bottom on printed copies.

- Shift-up of Image Area

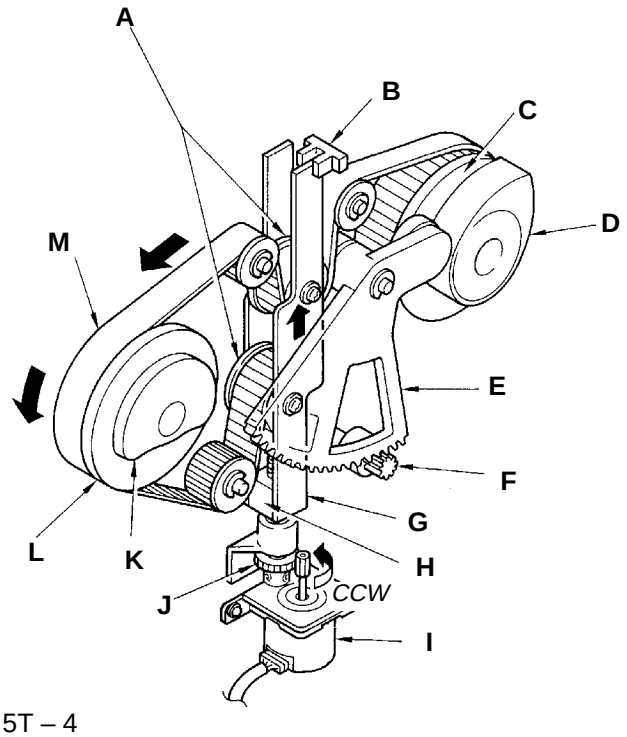
When the Print position button "UP" is pressed, the Print positioning motor rotates counter-clockwise, causing the Guide roller to start rotating later to shift the image area to the top on printed copies (by moving the belt and pulley in the direction opposite to the above case).

- Automatic Print Position Centering

The print position is automatically returned to the center (only vertically) by the Print positioning motor in the following cases: **1)** when the power switch is turned ON, **2)** when the "Centering" button is pressed, and **3)** when the "RESET" button is pressed.
<Mechanism>

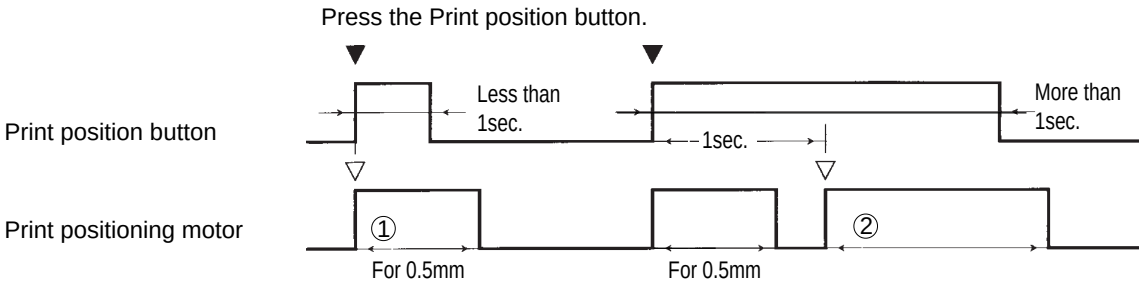
1. If the light path of the Vertical centering sensor is blocked by the Slide plate, the Print positioning motor is rotated until the light path is opened.
2. If the light path of the Vertical centering sensor is open, the Print positioning motor is rotated until the light path is blocked by the Slide plate, and then the motor is rotated in reverse until the light path is opened again.

A: Slide idler
B: Vertical centering sensor
C: Cam pulley
D: Guide roller cam
E: Sector gear
F: Guide roller
G: Slide plate
H: Slide shaft bracket
I: Print positioning motor
J: Slide gear
K: Pressure Cam
L: Main pulley
M: Main belt



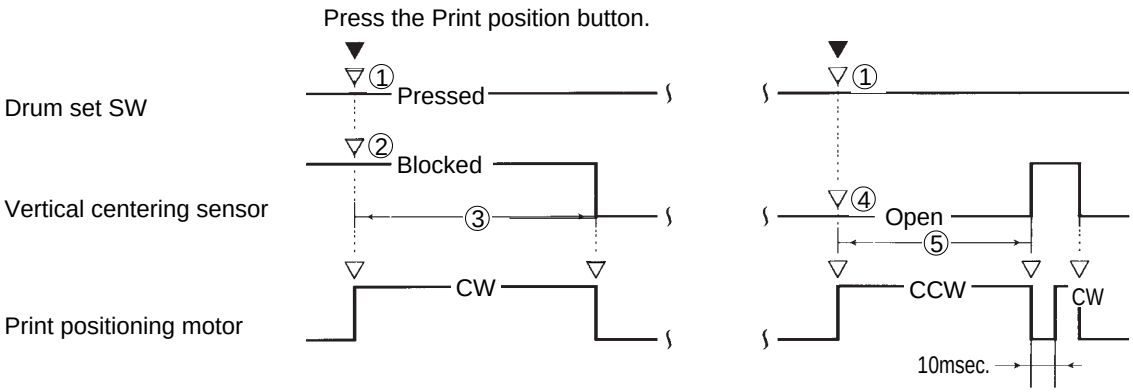
- Timing Chart -

Vertical Position Control System



① If the Print position button is pressed, the Print positioning motor is kept rotating until the print position is shifted by 0.5mm.
② If the Print position button has been pressed for more than 1 sec., the Print positioning motor restarts and keeps rotating (within the range of ±20mm from the center) while the button is kept pressing.

Automatic Print Position Centering Mechanism



① If the Drum set SW is not pressed ON, the Print positioning motor doesn't rotate for the automatic print position centering operation.
② If the light path of the Vertical centering sensor is blocked, the Print positioning motor rotates to lower the Slide plate.
③ If the light path of the Vertical centering sensor has not been opened within **12 seconds** after the Print positioning motor started operating, the machine assumes a Print positioning motor lock has occurred and displays the error code **[T 5]**.
④ If the light path of the Vertical centering sensor is open, the Print positioning motor rotates to raise the Slide plate.
⑤ If the light path of the Vertical centering sensor has not been blocked within **12 seconds** after the Print positioning motor started operating, the machine assumes a Print positioning motor lock has occurred and displays the error code **[T 5]**.

T5(Print Positioning Motor Lock)
- Vertical centering sensor not turned on/off

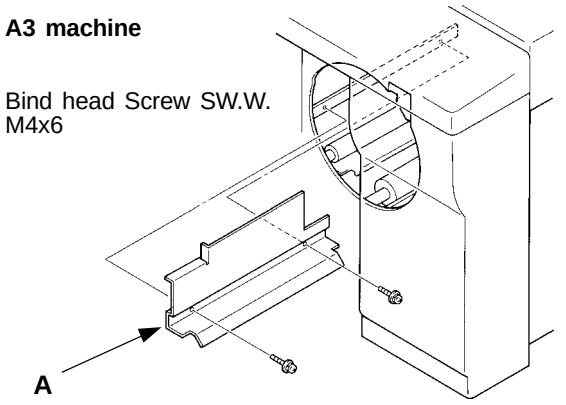
MEMO

REMOVAL & ASSEMBLY

1. Guide Roller Unit

< Removal Procedure >

1. Take out the Drum from the machine, turn OFF the power and remove the Back cover.
2. Remove two mounting screws on the Master removal F cover, and remove the plate(A3 model only).
3. Loosen two mounting screws and remove the Pressure control motor.
4. Remove two mounting screws and washers on the Timing adjustment plate, and remove the plate.
5. Remove the Timing spring.
6. Remove two mounting screws on the Guide roller shaft catch and pull out the Guide roller unit toward the Drive base side.
   [IMPORTANT]
   Be careful not to drop the collar bearing which is inserted into the side frame at the other end of the Guide roller.



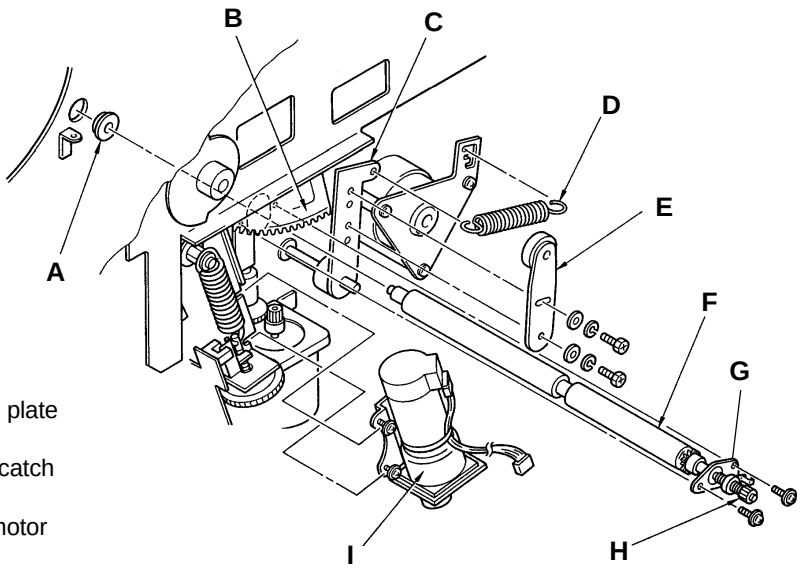
A: Master removal F cover

- Precautions in Assembly -

- Make sure that the Guide roller gear is well but not too tightly engaged with the Sector gear.
- Put grease well on the following parts: Load spring, One-way spring, Sector gear and Guide roller gear.
- Attach the Timing adjustment plate to the upper tapped hole in the Timing lever(see the figure).

- Adjustment after Assembly

- Parallelism of Timing Roller (Page 5A-1)
- Gap adjustment between the Timing lever and Timing cam (Page 5A-2)



A: Collar bearing
B: Sector gear
C: Timing lever
D: Timing spring
E: Timing adjustment plate
F: Guide roller
G: Guide roller shaft catch
H: Guide roller gear
I: Pressure control motor

2. One-way Spring and Load Spring

< Removal Procedure >

- Removal of One-way Spring

1. Remove the drum, turn off the power, and remove the following parts.
   - Back cover
   - (Master removal F cover), Pressure control motor, Timing adjustment plate, Timing spring, Guide roller unit
2. Remove the E-ring at the end of the Guide roller shaft.
3. Remove the Guide roller gear, turning it counter-clockwise (in the direction indicated by the arrow).
4. Remove the One-way spring, turning it counter-clockwise (in the direction indicated by the arrow).

- Load Spring

5. Loosen the allen screws inside the Guide shaft and remove it.
6. Remove the Load spring along with the Guide roller shaft catch, turning them counter-clockwise.

- Reassembly of Guide Roll Unit

1. Hook the Load spring onto the Guide roller shaft catch and fit it into the Guide roller shaft, turning it counterclockwise.
2. Fit in the Guide shaft. Do not tighten screws yet.
3. Fit the One-way spring into the Guide shaft, turning it counterclockwise.
4. Fit the Guide roller gear into the One-way spring, turning it counterclockwise.
5. Fit in the E-ring.
6. Shift the Guide roller gear, one-way spring, and guide shaft lightly to the E-ring side and tighten the two setscrews of the Guide shaft(see Fig. a).

- Checking after Reassembly -

- Move the Guide roller gear manually in the shaft direction to make sure that there is too much movement. Turn the Guide roller gear manually counterclockwise to make sure that it idles.

- Others -

- Apply grease thinly to the section on the Guide roller shaft where the Load spring and One-way spring come into contact with.

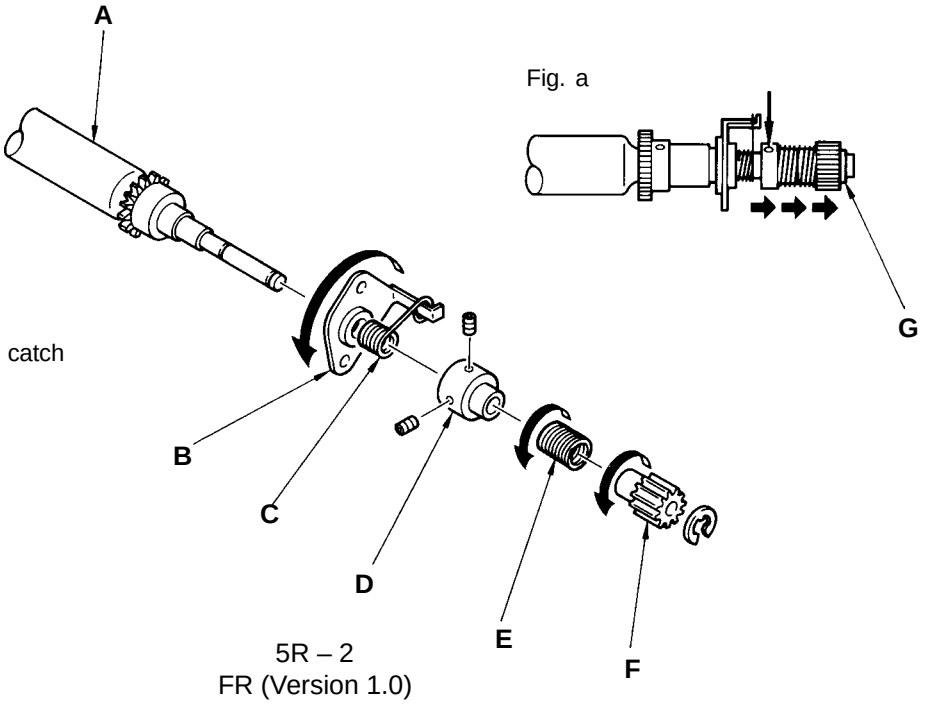


Fig. a

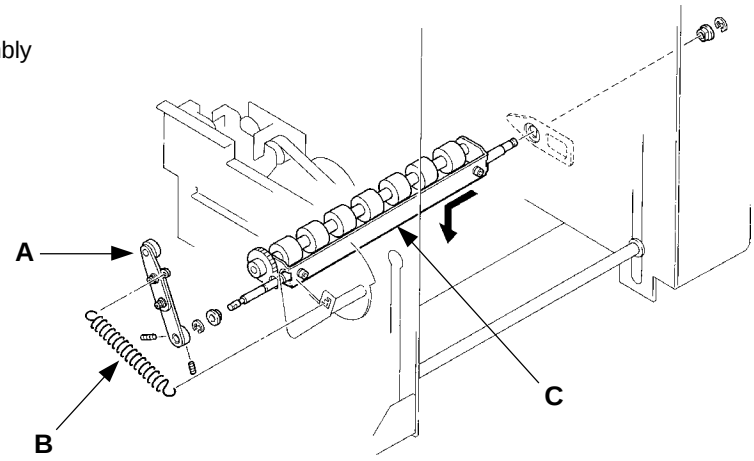
A: Guide roller
B: Guide roller shaft catch
C: Load spring
D: Guide shaft
E: One-way spring
F: Guide roller gear
G: E-ring

3. Timing Roller

< Removal Procedure>

1. Remove the Paper guide plate from the main body(page 5R-4).
2. Remove the Timing spring and Timing lever. Remove the E-rings and metals from both sides of the Timing shaft to detach the Timing roller assembly from the main body.

A: Timing lever
B: Timing spring
C: Timing roller assembly



Disassembly

1. Remove the Timing roller from the main body. (see above)
2. Loosen the screws of the Gear B to remove the gear.
3. Remove the E-rings and metals from both ends of the Timing roller to detach from the Timing roller support plate.

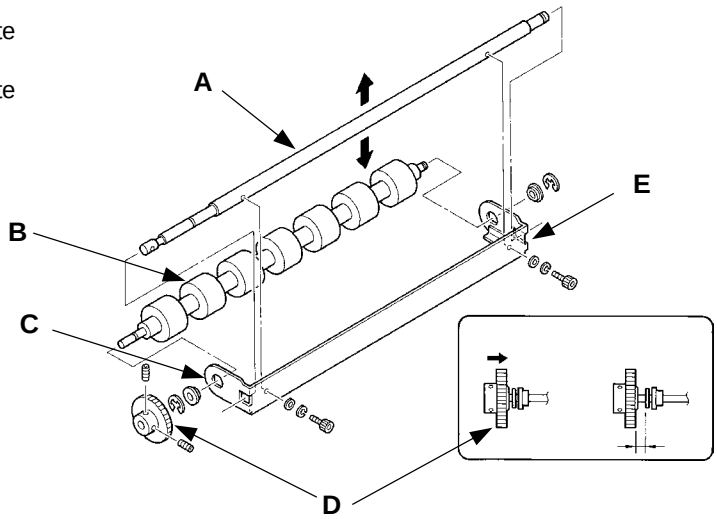
- Precautions in Assembly -

Set the Gear B onto the Timing roller shaft so that outer surface of the Gear B matches to the end of the shaft.

- Adjustment after Assembly -

Parallelism of Timing Roller (page 5A-1)
Gap between Timing Cam and Timing Lever (page 5A-2)

A: Timing roller shaft
B: Timing roller
C: Timing roller support plate
D: Gear B
E: Timing roller support plate



LED PDTC Paper detection sensor
– Light up when reflected light detected.
PTLS Paper size detection sensor
– Light up when reflected light detected.
P-IN Paper feed detection sensor
– Light up when light path is blocked.
PSEN Paper sensor
– Light up when light path is blocked.
Test Mode No.40 Paper feed safety switch
– Short interval beeps when released.

4. Paper Guide Plate

< Removal Procedure >

1. Move the Paper feed tray down to the lowest position, remove the Drum, turn off the power, and remove the following parts.
   - Back cover
   - Paper feed tray unit, paper feed cover, Scraper unit
   - Master removal unit
   - (Master removal F cover for A3 machine), Pressure control motor, Timing adjustment plate, Timing spring, Guide roller assembly
2. Disconnect the connector located on the Drive base side of the Paper guide plate.
3. Remove four mounting screws on the front of the Paper guide plate and two on the top, and take out the Paper guide plate from the machine.

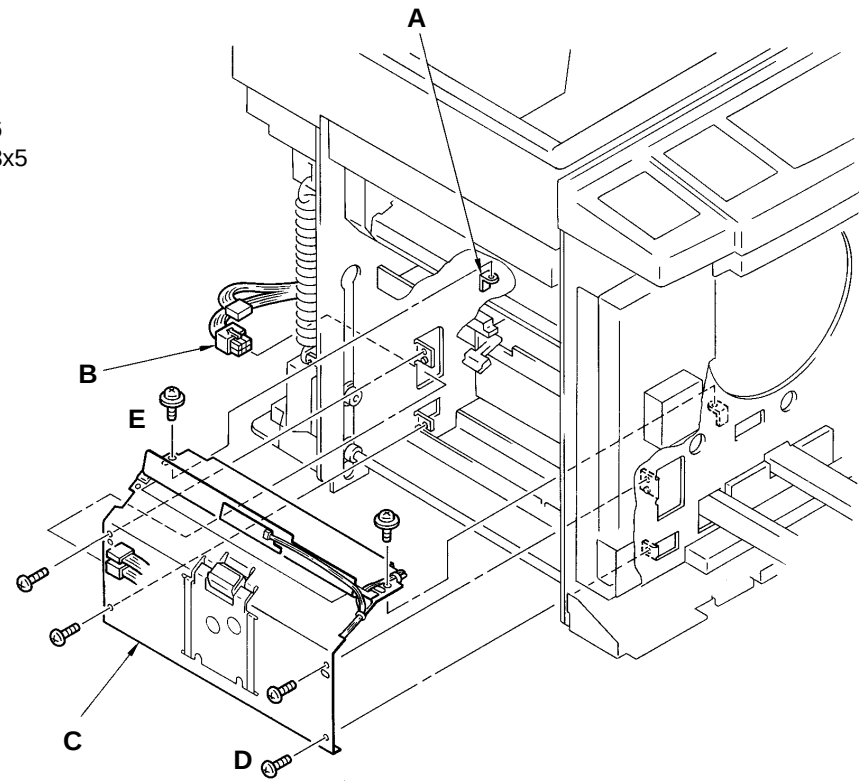
- Precautions in Assembly -

- Place the Paper guide plate on the bracket of the main body.
- If the bracket is moved by mistake, adjust the gap between the Guide plate and Guide roller.
- To adjust the height of the Paper guide plate, insert a 0.8 mm thick iron plate in between the Guide roller and Paper guide plate and fix the left and right brackets.
- Tighten the mounting screws after matching the bosses on the machine frame with the holes on the front side of the Paper guide plate.
- Be careful not to damage the Paper sensor with the Timing roller support plate.

- Adjustment after Assembly -

- Parallelism of Timing Roller (page 5A-1)
- Gap adjustment between the Timing lever and Timing cam (page 5A-2)

A: Bracket(L plate)
B: Connector
C: Paper guide plate
D: Bind-head Screw M4x6
E: Pan-head IT Screw M3x5



LED P-IN Paper feed detction sensor
– Light up when light path is blocked.
PSEN Paper sensor
– Light up when light path is blocked.
Test Mode No.25 Paper feed detection sensor
– Short interval beeps when light path is blocked.
No.6 Paper sensor
– Short interval beeps when light path is blocked.

5. Paper Sensor PCBs (Paper Sensor and Paper Feed Det. Sensor)

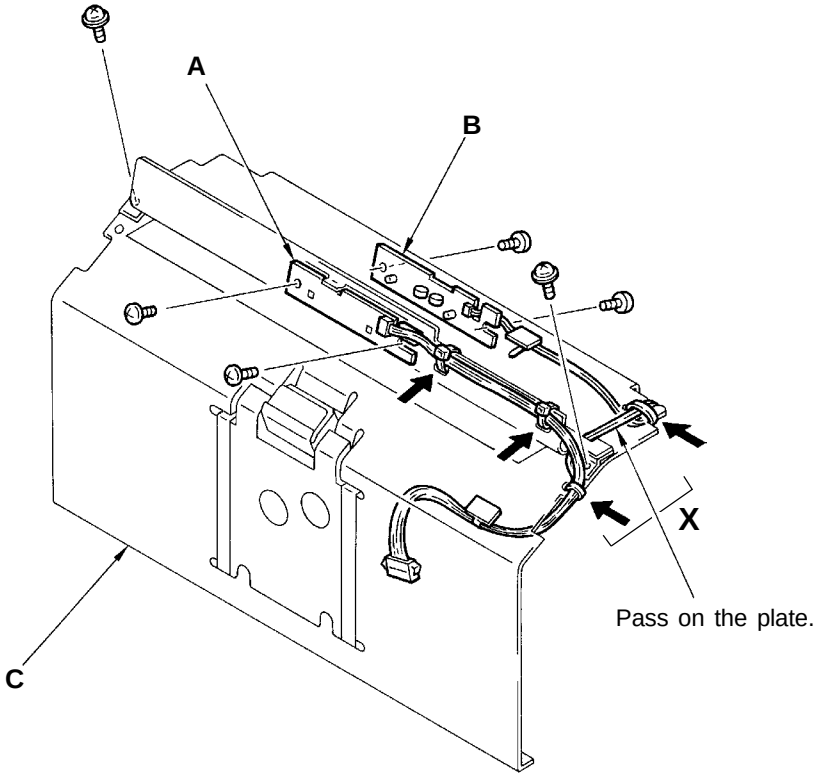
< Removal Procedure >

1. Remove the Paper guide plate, referring to the previous page.
2. Disconnect the connectorof the Paper sensor PCBs and cut the wire clampers holding the wires of the Paper sensor PCBs.
3. Remove two mounting screws on the respective Paper sensor PCBs and remove the PCBs.

- Precautions in Assembly -

- Pass the wires of the Paper sensor PCB (send) on the Paper guide plate when leading them in the X-marked part in the figure below.

A: Paper sensor PCB (Receive)
B: Paper sensor PCB (Send)
C: Paper guide plate



MEMO

ADJUSTMENT

1. Parallelism of Timing Roller

1. Take out the Drum from the machine and remove the Back cover.
2. Cut two strips of paper longways.
   Insert the paper strips through the Paper guide plate and into between the Guide roller and the Timing roller at the two points (a and b) indicated in the figure below.
3. Rotate the drive mechanism until the Timing roller is raised and the paper strips start to feed, by pressing **SW1** on the **System PCB**.
4. By pulling the paper strips toward you, check if they are gripped with equal pressure .
5. If not, loosen the securing screws on the Parallel adjustment plate and collar and turn the adjustment collar to adjust the balance of the Timing roller.

[IMPORTANT]

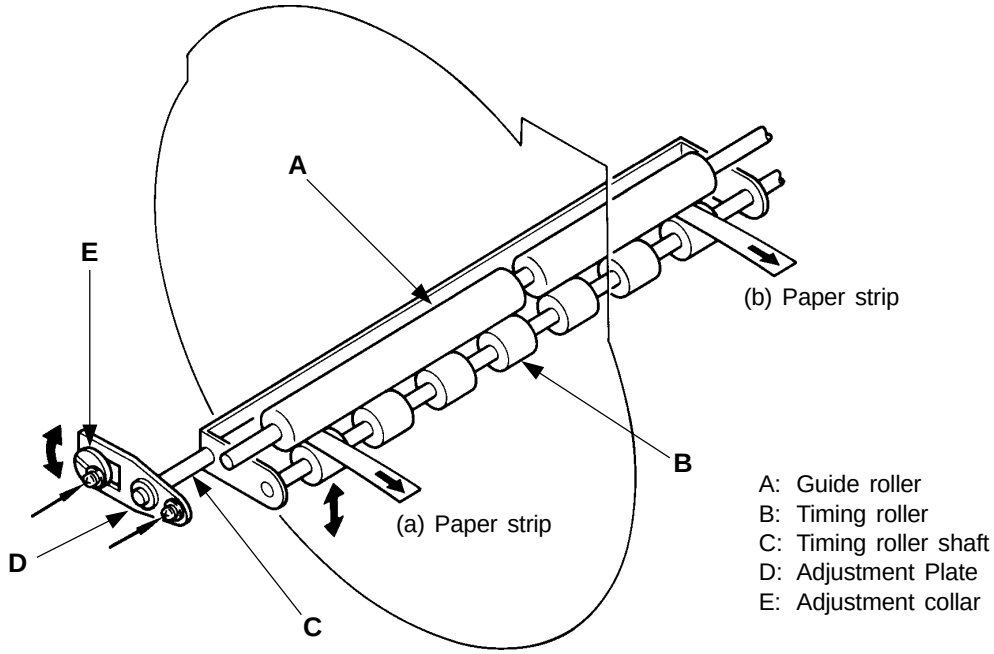
Check that the gap between the Timing cam and the cam follower on the Timing adjustmentplate is correctly adjusted after adjusting the parallelism of the Timing roller.

- Precautions in Adjustment -

- Make sure that paper strips are securely gripped by the rubber rollers of the Timing roller when the Timing roller is raised.

- Results of Misadjustment -

- If the Timing roller is not parallel to the Guide roller;
  paper may be pulled to one side in feeding through the second paper feed section.
  As a result, paper will skew or be wrinkled.



2. Gap between Timing Cam and Timing Lever

2-1 Position of Timing Adjustment Plate

1. Rotate the drive mechanism so that the small round part of the Timing cam faces the cam follower on the Timing adjustment plate, by pressing **SW1** on the **System PCB**.
   Turn OFF the power.
2. Check if the gap between the Timing cam and the cam follower on the Timing adjustment plate is approx. **2.5mm** (for example, by inserting a 2.5mm-thick hexagonal wrench between).
3. If not, loosen two securing screws on the Timing adjustment plate and adjust the position of the plate to get a 2.5mm-wide gap.
4. Tighten the securing screws on the Timing adjustment plate.

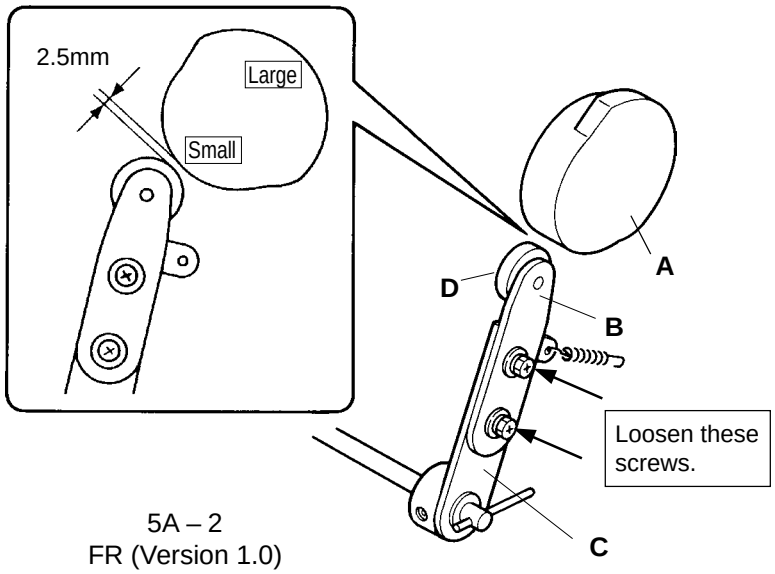
- Precautions in Adjustment -

- If a 2.5mm-wide gap can't be secured by adjusting the position of the Timing adjustment plate or if the Timing adjustment plate can't but be positioned doglegged to secure a 2.5mm-wide gap, adjust the position of the Timing lever before adjusting the position of the Timing adjustment plate.
  (Refer to the following page for the adjustment procedure of the Timing lever's position.)
  [IMPORTANT]
  <u>If the Timing adjustment plate is set doglegged, paper, especially cardboard, may not smoothly feed through the second paper feed section due to the change of the Timing spring's pressure.</u>

- Results of Misadjustment -

- If the gap between the Timing cam and the cam follower on the Timing adjustment plate is narrower than 2.5mm;
  the Timing roller is lowered too much and too early, which causes the Drive gear B to be disengaged from the Drive gear A when the Timing roller is set at the lowest position and shortens the paper feed range from the second paper feed section.
  As a result, a loud scratching noise will sometimes be heard during printing and paper will not feed smoothly through the second paper feed section, especially for the first sample print.
- If the gap between the Timing cam and the cam follower on the Timing adjustment plate is wider than 2.5mm;
  the Timing roller is raised too early and lowered too late.
  As a result, the trailing part of a fed sheet will be caught by the Timing roller, which makes ghost images (double images).

A: Timing cam
B: Timing adjustment plate
C: Timing lever
D: Cam follower

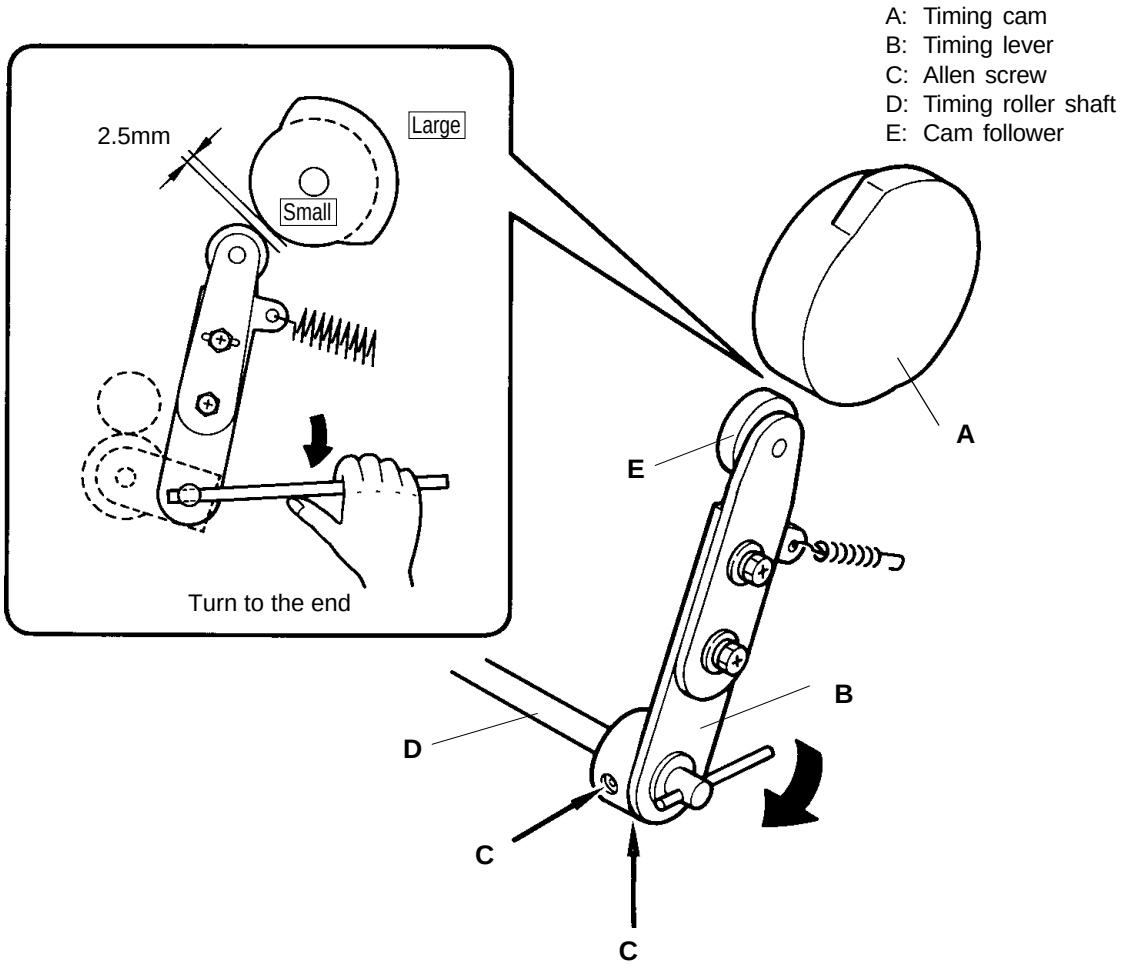


2-2 Position of Timing Lever

1. Check that the Timing adjustment plate is attached to the Timing lever in a line.
2. Rotate the drive mechanism so that the small round part of the Timing cam faces the cam follower on the Timing adjustment plate, by pressing **SW1** on the **System PCB**.
   Turn OFF the power.
3. Loosen two allen screws inside the root of the Timing lever on the Timing roller shaft.
4. Secure a **3mm**-wide gap between the Timing cam and the cam follower on the Timing adjustment plate (for example, by inserting a 3mm-thick hexagonal wrench between).
5. Insert a bar (like an allen key) into the hole at the end of the Timing roller shaft and turn the shaft clockwise to set the Timing roller in close contact with the Guide roller.
   [IMPORTANT]
   Confirm that the Drive gears on the roller shafts engage by moving the Sector gear by hand (to rotate the Guide roller).
6. Holding the shaft in this position, tighten the allen screws inside the root of the Timing lever.
7. Adjust the position of the Timing adjustment plate to change the gap between the Timing cam and the cam follower on the Timing adjustment plate to **2.5mm**, referring to the previous page.

- Precautions in Adjustment -

- Secure the Timing lever in the way it does not get in contact with the Main shaft face plate and Sector gear.



3. Vertical Print Position

There are two kinds of adjustment procedures for the vertical print position depending on the degree of difference in image position between an original and a printed copy as follow.

- If the difference is **less than 12mm**; → Adjust **(1) Position of Guide Roller Cam**.
- If the difference is **12mm or more**; → Adjust **(2) Arrangement of Main and Cam Pulleys**.

[IMPORTANT]

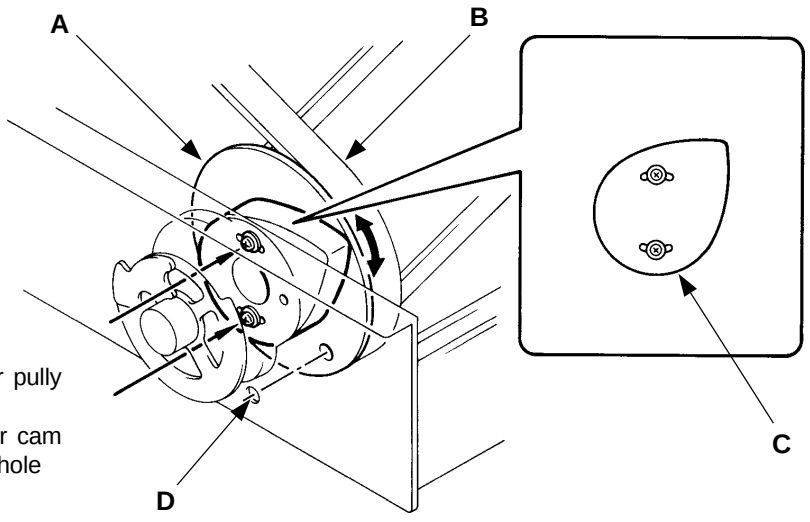
Remember that the following adjustment should be applied after confirming that the master-making and -loading positions are correct.

(1) Position of Guide Roller Cam

1. Check that images are transferred into the correct area on a master and the master is correctly loaded on the Drum.
   If no error is found in the master-making and -loading operations, make a new master with Test chart as an original.
2. First move the print position toward the bottom by the Print position button and return it to the center by the "Centering" button. Then print **5 to 10** copies at **speed 3**.
3. Check if a degree of discrepancy of registration between on the original and on printed copies is within allowance. The allowance is **±5mm**.
4. If it is beyond the allowance but **within12mm**, loosen two mounting screws on the Guide roller cam and adjust the installation position of the cam.
   [Note]
   - If the cam is moved clockwise, → the print position is shifted toward the bottom.
   - If the cam is moved counter-clockwise, → the print position is shifted toward the top.
5. Tighten the mounting screws on the Guide roller cam and check the print position by repeating the procedure in the step 2 above.

- Precautions in Adjustment -

- Don't loosen the mounting screws on the Timing cam. If they are loosened by mistake, secure them at the middle of the long hole.
- Move the Guide roller cam a little by a little because the vertical print position will be changed by more than 12mm only by adjusting the Guide roller cam's installation position.



A: Main motor pully
B: Main belt
C: Guide roller cam
D: Alignment hole

(2) Arrangement of Main and Cam Pulleys

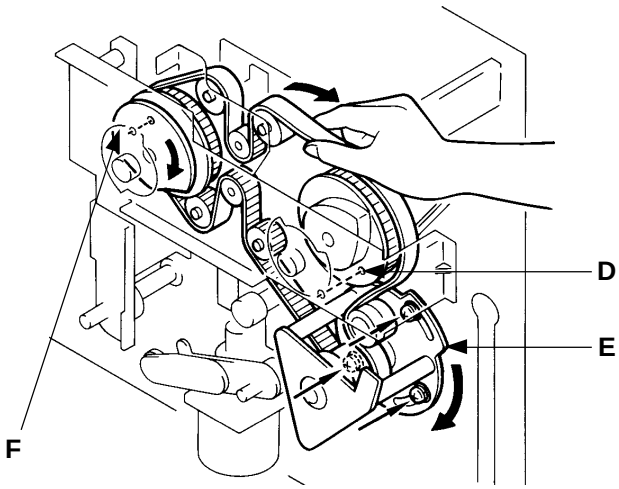
1. Return the print position to the center by the "Centering button and rotate the Drum to the home (A-plate detection) position.
2. Turn off the power and unhook the elevator spring from the drive side. Disconnect the connector of the Motor control PCB and ground wire. Remove three mounting screws to remove the unit.
3. Check if the holes on the Main shaft face plate are aligned with the counterparts on the Main pulley and Cam pulley.
4. If not, loosen three mounting screws on the Paper feed clutch base and turn the Paper feed clutch unit clockwise to release the tension of the Main belt.
5. Hold the main belt like pulling it. Turn the main pulley to align the alignment hole.
6. Turn the Paper feed clutch unit counter-clockwise to apply tension to the Main belt. Tighten the mounting screws on the Paper feed clutch base while applying tension.
   [Note]
   When applying tension to the Main belt, the Cam pulley alignment hole will move down a little or the Main pulley alignment hole will move up a little.
7. Attach the Motor control PCB and Elevator spring, and check a vertical print position.
8. Check the hole alignment once more to confirm the correct arrangement of the Main and Cam pulleys.
   After confirming the correct arrangement of the pulleys, check the print registration following the adjustment procedure of the Guide roller cam's installation position.
   (Refer to the previous page.)

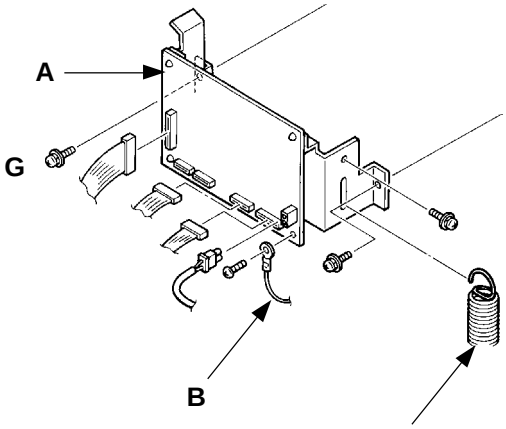
- Adjustment after Assembly

- Position of the P Disc (Page 4A-5)

- Results of Misadjustment -

- If the Guide roller cam is not positioned correctly or the Main and Cam pulleys are not correctly arranged ;
  1) the print registration will still be incorrect.
     The print position is shifted about 12mm by one-gear-tooth discrepancy of the arrangement of the Cam pulley.
  2) paper will not feed properly and jam in the second paper feed section.
  3) printed paper will stick on the drum.





A: Motor conrol PCB
B: Ground wire
C: Elevator spring
D: Alignment hole(Main pulley)
E: Paper feed clutch base
F: Alignment hole(Main shaft and Pressure cam)
G: Pan-head Screw SW. W M4x6

4. Position of Timing Cam

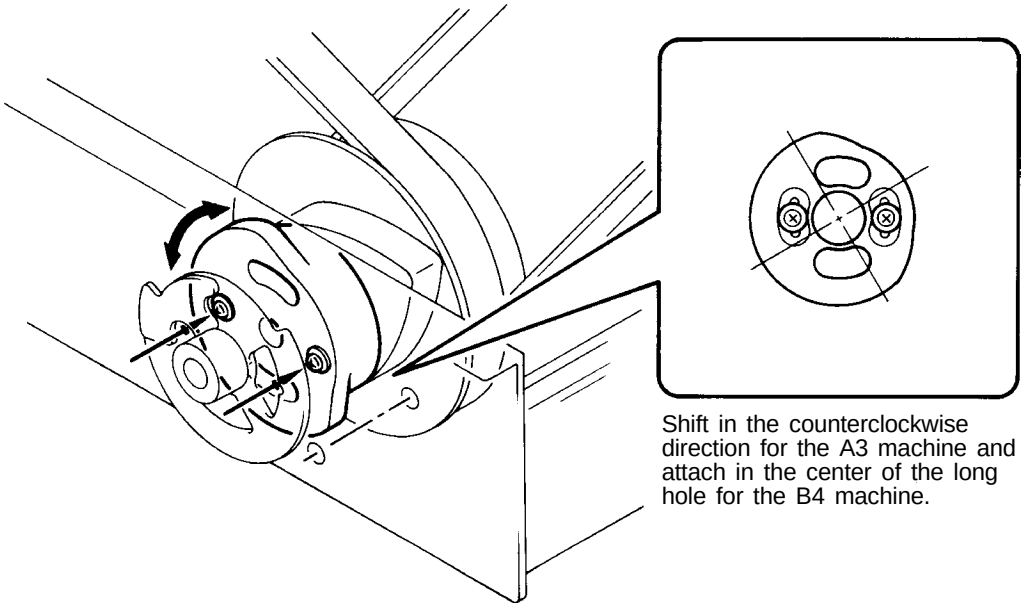
This adjustment is required only when the position of the timing cam was moved, mistaking it for the guide roller cam. It is subjected that the gap between the timing lever and timing cam has been properly adjusted.

- Adjustment and Checking

1) Attach the Timing cam to the following position.
   For the A3 machine —— Shift in the counterclockwise direction to attach.
   For the B4 machine —— Attach in the center of the mounting hole.
2) Make a master with A3-size original for the A3 machine and a B4-size original for the B4 machine, and print on the A3-size paper.
3) Make sure that there are no ghosts, even if the vertical print position is maximumly shifted either “upward” or “downward.”
4) If there is any ghost, loosen the setscrews of the Timing cam and move it in the following directions to make adjustment.
   - When the ghost appears at the beginning of the paper —— Shift the Timing cam in the clockwise direction.
   - When the ghost appears at the end of the paper —— Shift the Timing cam in the counter-clockwise direction.

- Result of Misadjustment -

If the Timing cam is dislocated in the clockwise direction, the paper may not reach the press roller due to earlier release timing of the Timing roller, displaying “PAPER JAM. CHECK PAPER FEED AREA.”
The contact timing of the Timing roller may become earlier, catches the rear end of the sheets of paper during printing, applies the back tension, thus causing the ghost.
On the contrary, if the Timing cam is dislocated in the counterclockwise direction, the release timing of the Timing roller may be delayed, and the back tension may be applied catching the paper despite that printing has begun with the press roller, thus causing the ghost.



Shift in the counterclockwise direction for the A3 machine and attach in the center of the long hole for the B4 machine.

CHAPTER 6: PRESS SECTION

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LED PSEN Paper sensor
– Light up when light path is blocked
LED PRSS Pressure detection sensor
– Light up when light path is blocked
Test Mode No. 6 Paper sensor
– Short interval beeps when light path is blocked
No. 7 Pressure detection sensor
– Short interval beeps when light path is blocked

THEORY OF OPERATION

1. Press System (Activate by the Pressure detection sensor)

- Conversion of Rotation to Up-and-Down Motion via Pressure Cam

The Pressure cam, which is attached to the Main pulley, continuously rotates clockwise via the Main belt, which drives the Main pulley, when the Main motor rotates.

The rotation of the Pressure cam provides the drive for the Linking plate.

As the cam follower of the Linking plate contacts the Pressure cam, the high and low points of the cam convert the rotation movement of the cam to an up-and-down motion of the Linking plate.

- The Up-and-Down Motion of Pressure Hook

The up-and-down motion of the Linking plate is conveyed to the Pressure hook through the Pressure links. The Pressure hook moves up and down with the Pressure shaft as the fulcrum.

- Operation of Pressure Solenoid

The Pressure solenoid, which is attached to the Pressure hook and Hook lever assembly, functions to engage the Hook lever assembly with the Pressure lever.

- Control of Pressure Solenoid

The Pressure solenoid is activated ON when paper is detected by the Paper sensor while the Print signal is output (ON). When the Pressure solenoid is activated ON, the Hook lever assembly is engaged with the Pressure lever. Then, moment the the light path of the Pressure detection sensor is turned from the shut-off state to the light sensing state, the paper sensor is checked. If the next sheet of paper has reached the paper sensor, the Pressure solenoid will remain turned on.

For this reason, the Hook assembly is kept hooked on the Pressure lever. If the next sheet has not reached the paper sensor, on the contrary, the pressure solenoid will be turned off once, and turned on again when the next sheet shuts off the light path of the paper sensor.

- Lifting of Pressure Roller

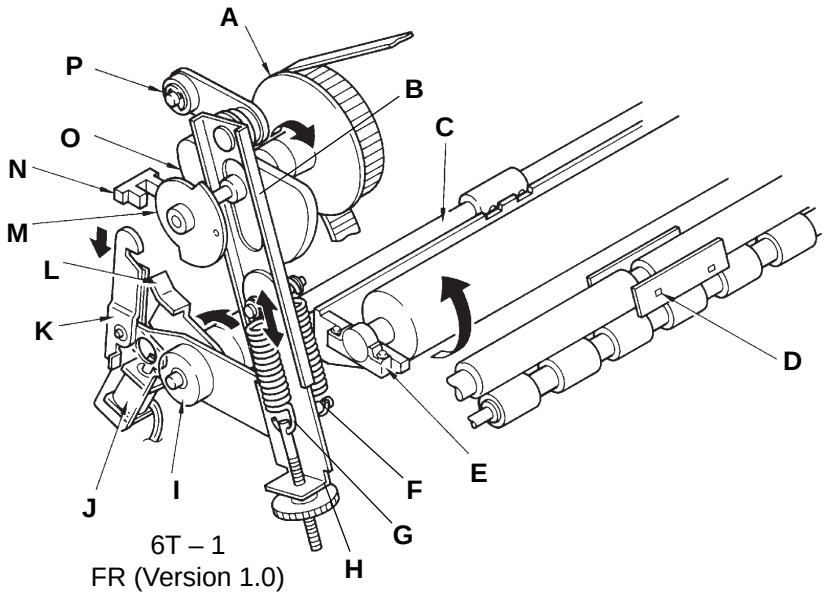
While the Hook lever assembly is engaged with the Pressure lever, the Pressure lever is pulled down by the descending Hook lever, turning the Pressure shaft counter-clockwise because the Pressure lever is attached on the Pressure shaft.

To the Pressure shaft is attached the Pressure roller support on which the Pressure roller is placed. Therefore, when the Pressure shaft rotates counter-clockwise, the Pressure roller is lifted up to the Drum, pressing a sheet of paper against the Drum.

- Function of Pressure Links

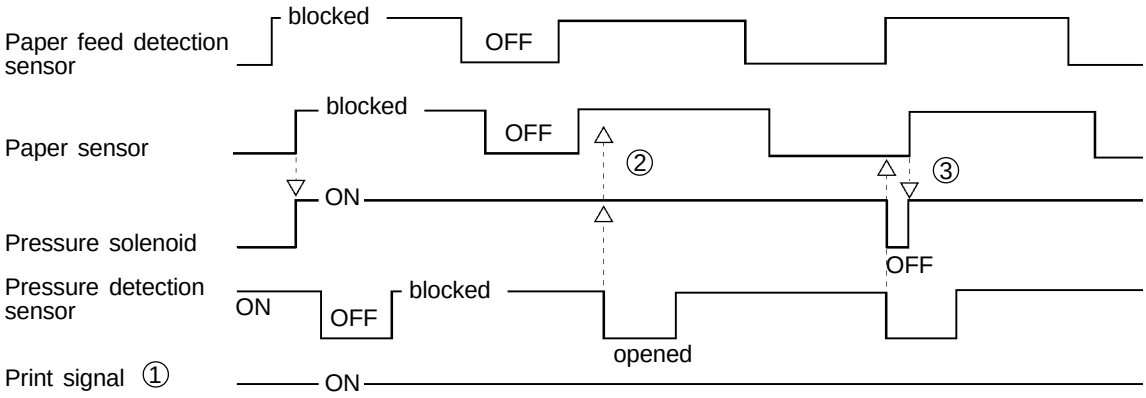
While the Pressure roller is in contact with the Drum, the Pressure link (top) is raised by the Pressure cam, pulling the Pressure springs A and B to apply pressure to the Drum and transfer ink from the Drum onto a sheet of paper.

A: Main shaft
B: Pressure link (top)
C: Pressure shaft
D: Paper sensor
E: Pressure roller support
F: Pressure spring B
G: Pressure spring A
H: Pressure link (bottom)
I: Pressure hook
J: Pressure solenoid
K: Hook lever assembly
L: Pressure lever
M: Pressure disc
N: Pressure det. sensor
O: Pressure cam
P: Linking plate

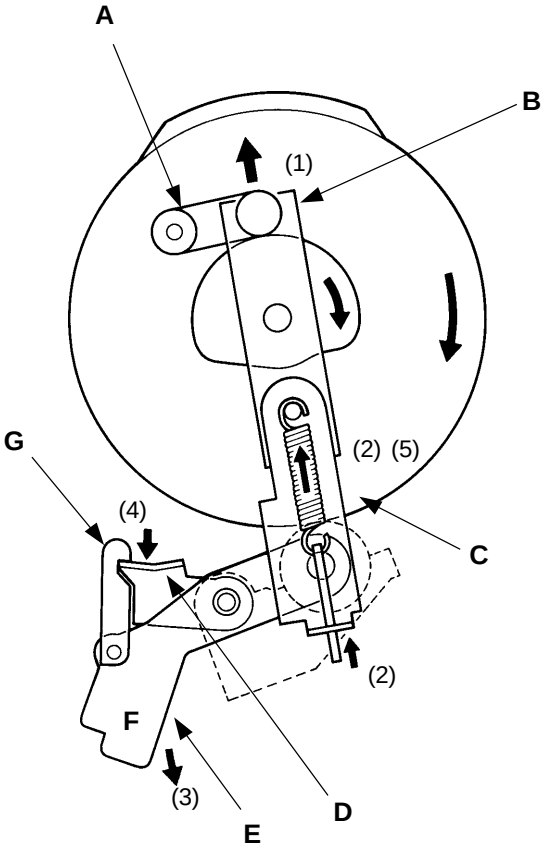


Test Mode No.6 Paper sensor
– Short interval beeps when light path is blocked
No.7 Pressure detection sensor
– Short interval beeps when light path is blocked
No.68 Pressure solenoid

Pressure Solenoid Operation Timing Chart (While Printing)



1. The Print signal starts the paper feed operation. If the light path of the Paper feed clutch sensor is opened while the Print singnal is ON, the Paper feed clutch is engaged.
2. The moment the light path of the Pressure detection sensor senses the light, the Pressure solenoid is turned on consecutively when the light path of the Paper sensor is shut off.
3. If the light path of the Paper sensor is not shut off the moment the light path of the Pressure detection sensor senses the light, the Pressure solenoid will be turned off once, and turned on again when the next sheet shuts off the light path of the Paper sensor.



(1) The convex of the Pressure cam raises the bearing of the Linking plate.
(2) The Upper link raises the Pressure spring, thus raising the Lower link.
(3) The Hook lever assembly is lowered.
(4) The Pressure lever is lowered and the Pressure roller is raised.
(5) The Upper link is further raised after the Pressure roller presses against the Drum. As a result, the Pressure spring is expanded to apply a pressure.

A: Linking plate
B: Pressure link (top)
C: Pressure link (bottom)
D: Pressure lever
E: Pressure hook
F: Pressure solenoid
G: Hook

LED PSEN Paper sensor
– Light up when light path is blocked
Test Mode No. 6 Paper sensor
– Short interval beeps when light path is blocked

2. Press System (Activate by Drum Angle)

- Conversion of Rotation to Up-and-Down Motion via Pressure Cam

The Pressure cam, which is attached to the Main pulley, continuously rotates clockwise via the Main belt, which drives the Main pulley, when the Main motor rotates.

The rotation of the Pressure cam provides the drive for the Linking plate.

As the cam follower of the Linking plate contacts the Pressure cam, the high and low points of the cam convert the rotation movement of the cam to an up-and-down motion of the Linking plate.

- The Up-and-Down Motion of Pressure Hook

The up-and-down motion of the Linking plate is conveyed to the Pressure hook through the Pressure links. The Pressure hook moves up and down with the Pressure shaft as the fulcrum.

- Operation of Pressure Solenoid

The Pressure solenoid, which is attached to the Pressure hook and Hook lever assembly, functions to engage the Hook lever assembly with the Pressure lever.

- Control of Pressure Solenoid

The Pressure solenoid is activated ON when paper is detected by the Paper sensor while the Print signal is output (ON). When the Pressure solenoid is activated ON, the Hook lever assembly is engaged with the Pressure lever.

The Pressure solenoid will remain turned on at certain Drum angle if the next sheet of paper has reached the paper sensor.

For this reason, the Hook assembly is kept hooked on the Pressure lever.

If the next sheet has not reached the Paper sensor, on the contrary, the Pressure solenoid will be turned OFF once, and turned on again when the next sheet is detected by the Paper sensor.

- Lifting of Pressure Roller

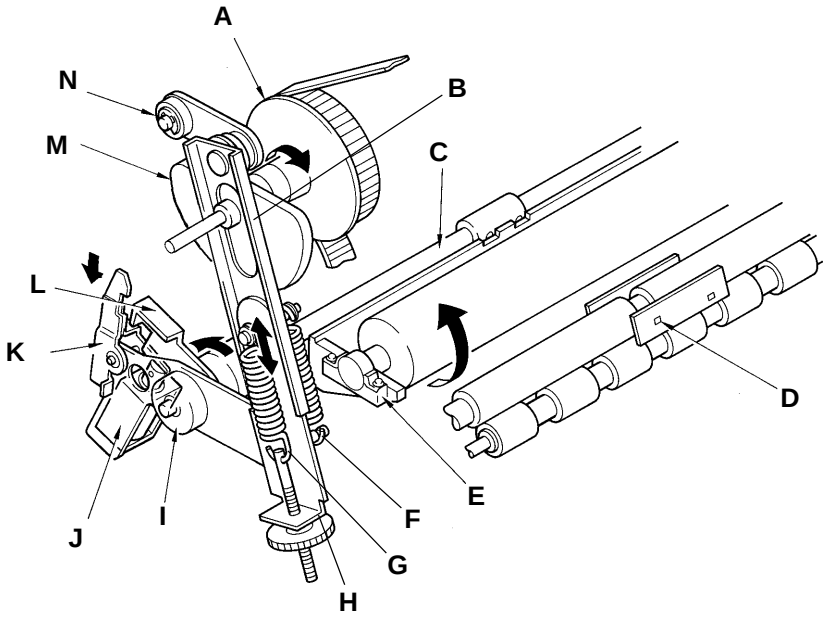
While the Hook lever assembly is engaged with the Pressure lever, the Pressure lever is pulled down by the descending Hook lever, turning the Pressure shaft counter-clockwise because the Pressure lever is attached on the Pressure shaft.

To the Pressure shaft is attached the Pressure roller support on which the Pressure roller is placed. Therefore, when the Pressure shaft rotates counter-clockwise, the Pressure roller is lifted up to the Drum, pressing a sheet of paper against the Drum.

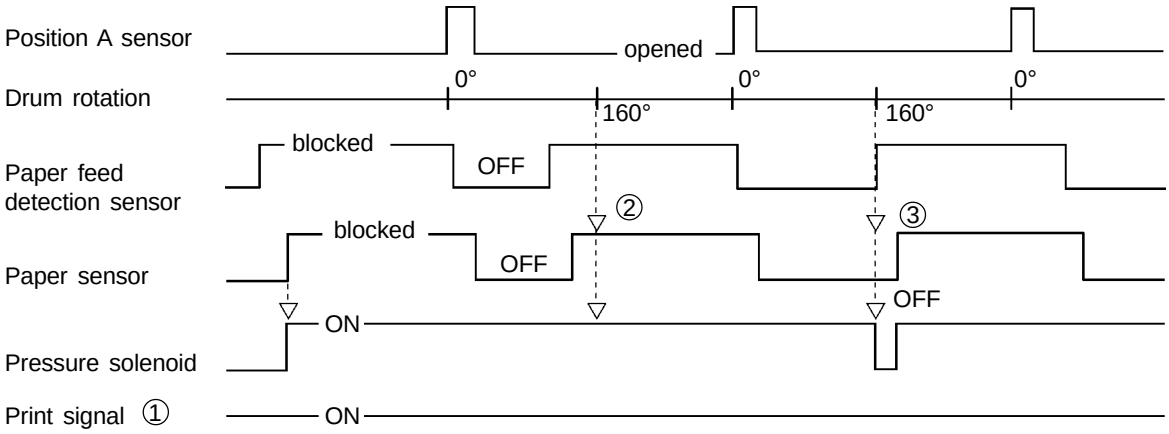
- Function of Pressure Links

While the Pressure roller is in contact with the Drum, the Pressure link (top) is raised by the Pressure cam, pulling the Pressure springs A and B to apply pressure to the Drum and transfer ink from the Drum onto a sheet of paper.

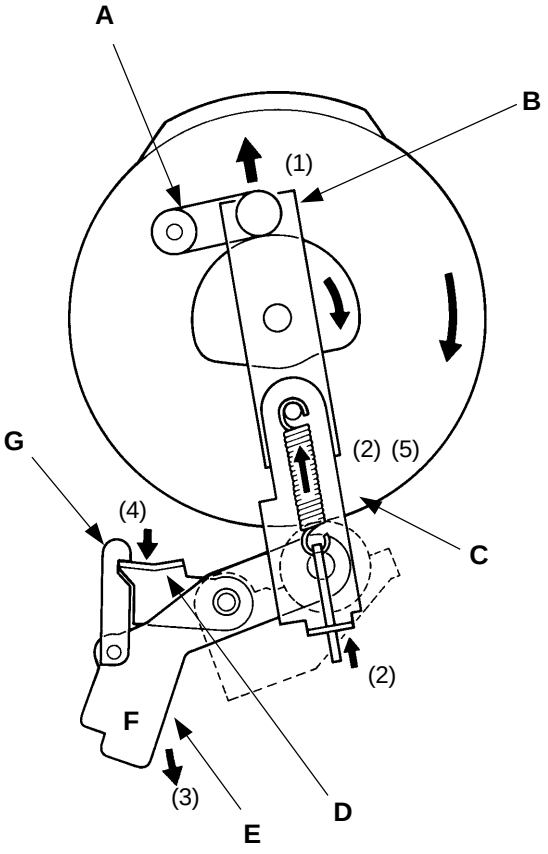
A: Main shaft
B: Pressure link (top)
C: Pressure shaft
D: Paper sensor
E: Pressure roller support
F: Pressure spring B
G: Pressure spring A
H: Pressure link (bottom)
I: Pressure hook
J: Pressure solenoid
K: Hook lever assembly
L: Pressure lever
M: Pressure cam
N: Linking plate



Pressure Solenoid Operation Timing Chart (While Printing)



1. The Print signal starts the paper feed operation. If the light path of the Paper feed clutch sensor is opened while the Print signal is ON, the Paper feed clutch is engaged.
2. The moment the Drum rotates 160° from the 0° position, the Pressure solenoid is turned on consecutively when the light path of the paper sensor is blocked.
3. If the light path of the Paper sensor is not blocked at Drum angle 160°, the Pressure solenoid will be turned OFF once, and turned ON again when the next sheet is detected by Paper sensor.



(1) The convex of the Pressure cam raises the bearing of the Linking plate.
(2) The Upper link raises the Pressure spring, thus raising the Lower link.
(3) The Hook lever assembly is lowered.
(4) The Pressure lever is lowered and the Pressure roller is raised.
(5) The Upper link is further raised after the Pressure roller presses against the Drum. As a result, the Pressure spring is expanded to apply a pressure.

A: Linking plate
B: Pressure link (top)
C: Pressure link (bottom)
D: Pressure lever
E: Pressure hook
F: Pressure solenoid
G: Hook

LED PRP Pressure control sensor
– Light up when light path is opened
Test Mode No. 53 Pressure control sensor
– Short interval beeps when light path is blocked

3. Pressure Regulation System

- Basic

The printing density is changed by turning ON the Pressure control motor.
The Pressure control motor changes the printing pressure by controlling the length of the Pressure springs.
The printing pressure, broken down into 18 levels, is determined by the print density setting, print speed setting and the temperature of ink (inside the drum).
The Pressure control sensor keeps track of the initial pressure position (home position).

- Pressure Regulation System

The pressure control motor rotates up or down to a specified position.
This motion is conveyed to the Print pressure adjustment screw via the Print pressure adjustment gear, changing the tension (pull power) of the Pressure spring, which changes the print pressure.
An encoder sensor is attached on top of the Pressure control motor to count the number of rotation the motor has made.

- Initial Pressure Position (home position) -- Pressure Level No.13

The machine looks for the initial pressure position each time the main power is turned ON or All Reset button is pressed.
In this case, the Pressure control motor operates depending on the condition of the Pressure control sensor, as described below.

- **If the light path of the Pressure control sensor is open ;**
  The Pressure control motor rotates until the light path is blocked by the Bracket B, then rotates in the reverse direction until the light path is opened again.
- **If the light path of the pressure control sensor is blocked by the Bracket B:**
  The Pressure control motor rotates until the light path of the sensor is opened.

The initial (home) pressure position of the printing pressure is Level No.13 Once the initial pressure position is achieved, the Pressure control motor rotates until the pressure level is adjusted to the equivalent of Print speed No.1. The printing starts from the low speed and is increased, changing the pressure at the same time, until a selected speed is achieved.

- At Speed-change Mode

When the Print speed button on the operation panel is pressed to change the printing speed, the pressure is increased as the speed is increased to keep the print density constant.

[Note] If the Print speed button is pressed while the machine is in idle, the Pressure control motor does not rotate until printing starts.

- At Density-change Mode

When the Print density button on the operation panel is pressed to change the print density, the pressure is increased as the density is increased.

<Density Setting 3(Black Drum Used) at Speed Mode>

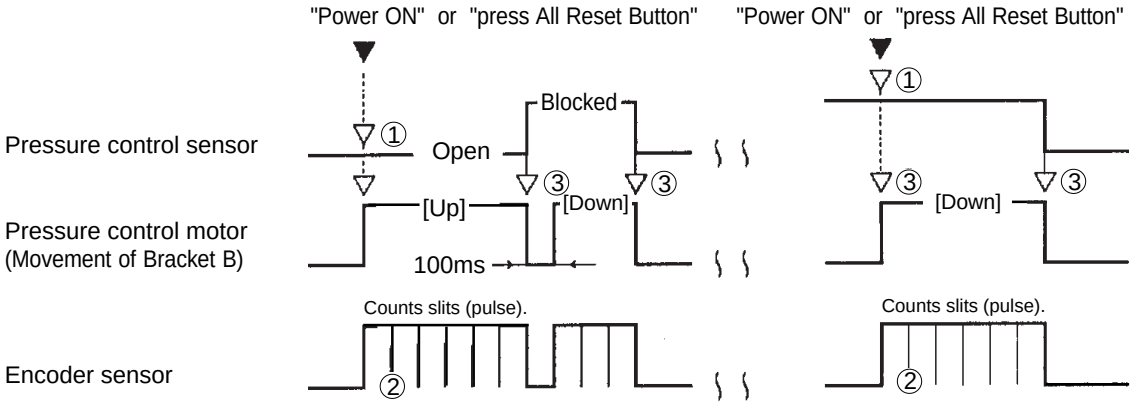
Drum Temperature \ Speed Mode	Fast Print	Speed 1	Speed 2	Speed 3	Speed 4	Speed 5
Up to 9.0° (AB or above)	Level 21	Level 21	Level 23	Level 23	Level 23	Level 23
9.0 to 12.0° (AA to 9C)	Level 19	Level 17	Level 19	Level 23	Level 23	Level 23
12.0 to 15.0° (9B to 8D)	Level 15	Level 13	Level 15	Level 19	Level 23	Level 23
15.0 to 18.0° (8C to 7E)	Level 11	Level 9	Level 13	Level 15	Level 21	Level 23
18.0 to 21.0° (7D to 6F)	Level 7	Level 7	Level 11	Level 13	Level 19	Level 21
21.0 to 24.0° (6E or below)	Level 6	Level 7	Level 9	Level 11	Level 17	Level 19

- The pressure is the lowest at Level 6 and the highest at Level 23.
- The value in parentheses is a drum internal temperature AD value. The Test Mode No. 115 allows you to check the drum internal temperature and AD value.

Test Mode No.53 Pressure control sensor
– Short interval beeps when light path is blocked
No.114 Pressure variable operation
No.115 Drum thermistor AD Value & Temperature display

- Timing Chart -

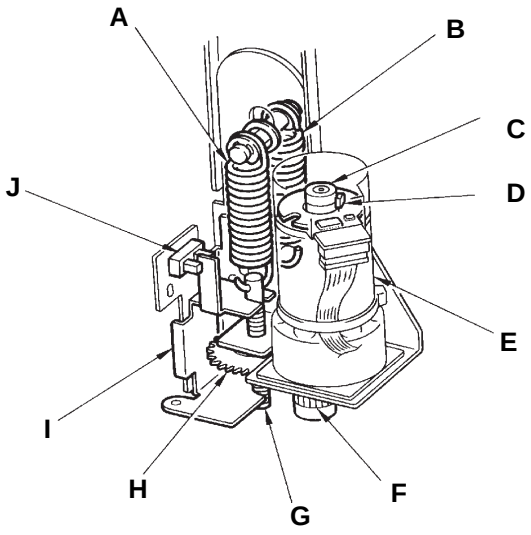
Pressure Regulation System (Initial Movement)



① When the power is turned ON or All reset button is pressed, the light path of the Pressure control sensor is checked.
② If no pulse is transmitted from the Encoder sensor within **100ms** after the Pressure control motor is turned ON, the machine assumes a Pressure control motor lock has occured and indicates the error code **[T 11]**.
③ If light path of the Pressure control sensor is not "blocked" or "opened" within **5 seconds** after the Pressure control motor is turned ON, the machine assumes a Pressure control motor lock has occured and indicates the error code **[T 11]**.

T11 (Pressure Motor Lock)
• Press control sensor not turned on/off • Pressure encoder sensor unchanged

A: Pressure spring A
B: Pressure spring B
C: Magnet Disc
D: Encoder sensor
E: Pressure control motor
F: Motor gear
G: Print pressure adjustment screw
H: Print pressure adjustment gear
I: Pressure control bracket B
J: Pressure control sensor



REMOVAL & ASSEMBLY

1. Main Shaft Face Plate

< Removal Procedure >

1. Open the Front cover and press the Drum home position button to set the Drum at the home position (Position A).
   Turn OFF the power and remove the Back cover.
2. Remove the Timing spring.
3. Loosen three mounting screws on the Paper feed clutch base and turn the Paper feed clutch unit clockwise to release the tension of the Main belt.
4. Loosen the allen screws securing the P disc and Pressure sensor disc and remove these discs.
5. Remove two mounting screws on the Pressure shaft face plate and remove the plate.
6. Disconnect the connectors of the Paper feed clutch sensor and Pressure detection sensor, and cut the wire clampers fastening the wire harnesses on the Main shaft face plate.
7. Remove six mounting screws on the Main shaft face plate and remove the plate.

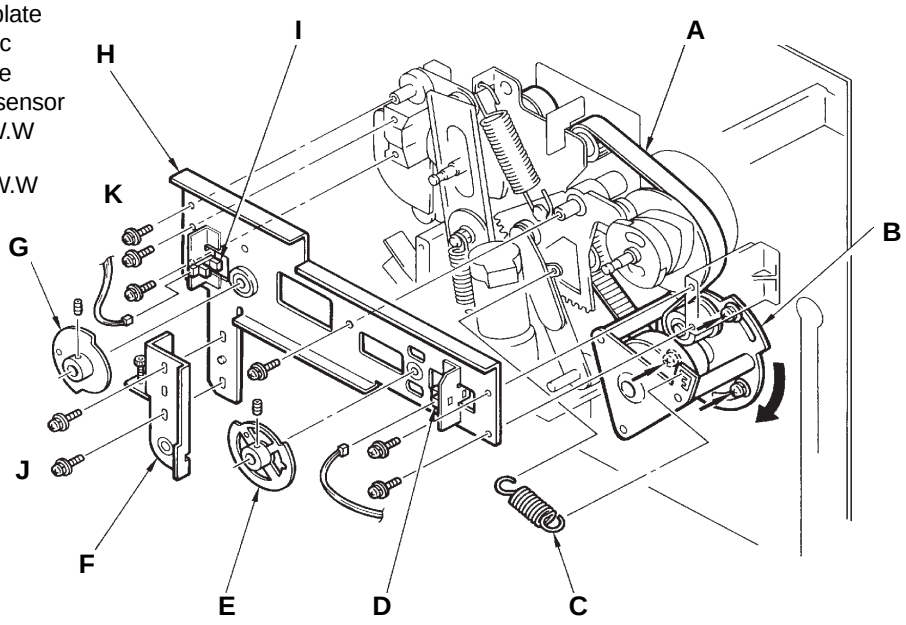
- Precautions in Assembly -

- After securing the Main shaft face plate, always check if the Drum can be smoothly pulled out of and pushed into the machine.
  If not, loosen the mounting screws on the Main shaft face plate and change the position of the plate to obtain the correct position of the Main shaft.

- Adjustments after Assembly -

- Resting Position of Pressure Lever (page 6A-3)
- Position of the Pressure sensor disc (page 6A-7)
- Position of the P Disc (page 4A-5)

A: Main belt
B: Paper feed clutch base
C: Timing spring
D: Paper feed clutch sensor
E: P disc
F: Pressur shaft face plate
G: Pressure sensor disc
H: Main shaft face plate
I: Pressure detection sensor
J: Pan-head screw SW.W M4X10
K: Pan-head Screw SW.W M4X10



2. Pressure Link Ass'y

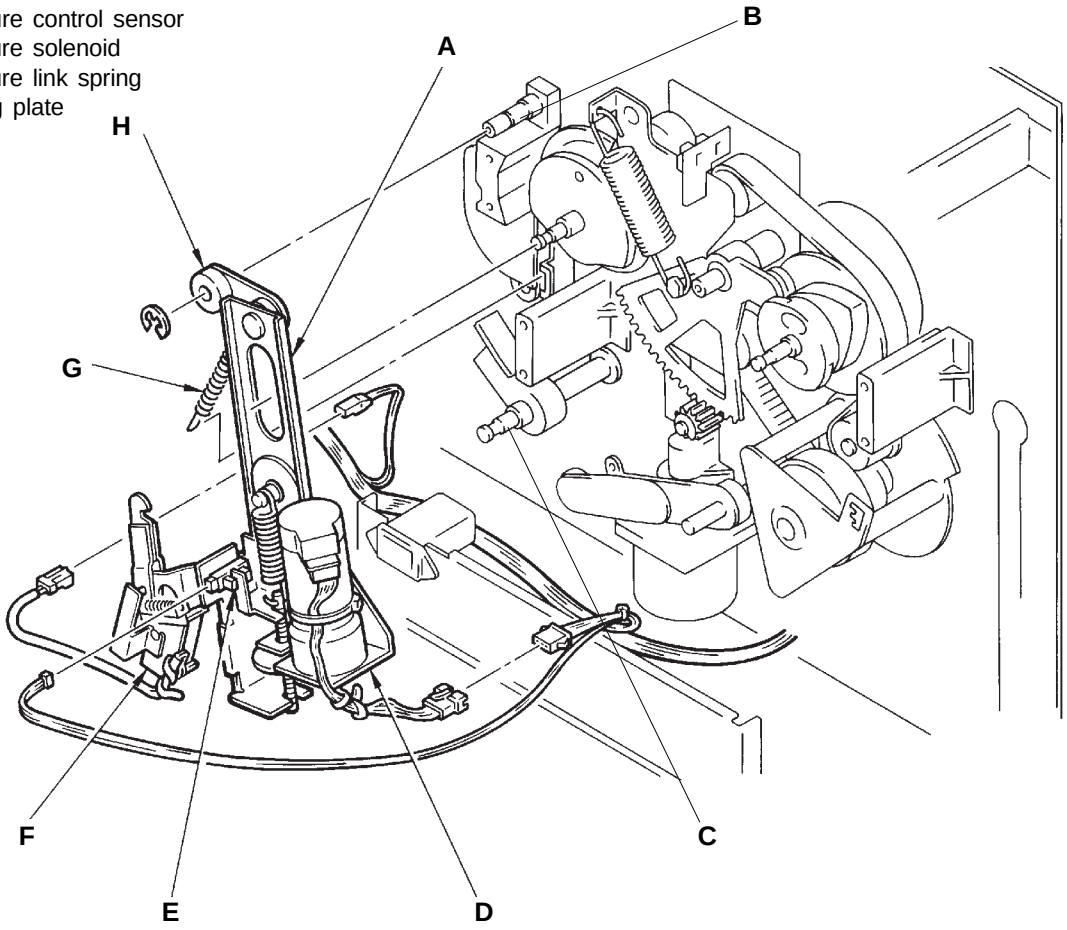
< Removal Procedure >

1. Remove the Main shaft face plate, referring to the previous page.
2. Disconnect the connectors of the following parts: Pressure control motor, Pressure control sensor and Pressure solenoid
3. Unhook the Pressure link spring at the lower point.
4. Remove an E ring on the Linking plate shaft and then remove the Pressure link ass'y (which includes the Pressure hook), sliding the Linking plate and the Pressure hook off the respective shafts.
   [IMPORTANT]
   Never force the Pressure link ass'y off the Drive base unit to avoid deformation of the Pressure links. If they are deformed, they will not smoothly move up and down after assembly.

- Adjustments after Assembly -

- Resting Position of Pressure Lever (page 6A-3)
- Position of the Pressure sensor disc (page 6A-7)
- Position of the P Disc (page 4A-5)

A: Pressure link ass'y
B: Pressure link shaft
C: Pressure shaft
D: Pressure control motor
E: Pressure control sensor
F: Pressure solenoid
G: Pressure link spring
H: Linking plate



3. Pressure Lever, Pressure Shaft

Pressure Lever
< Removal Procedure >

1. Remove the Pressure link ass'y, referring to the previous page.
2. Unhook the Pressure lever spring at the upper point.
3. Loosen two allen screws securing the Pressure lever and then remove the Pressure lever, sliding it off the Pressure shaft.

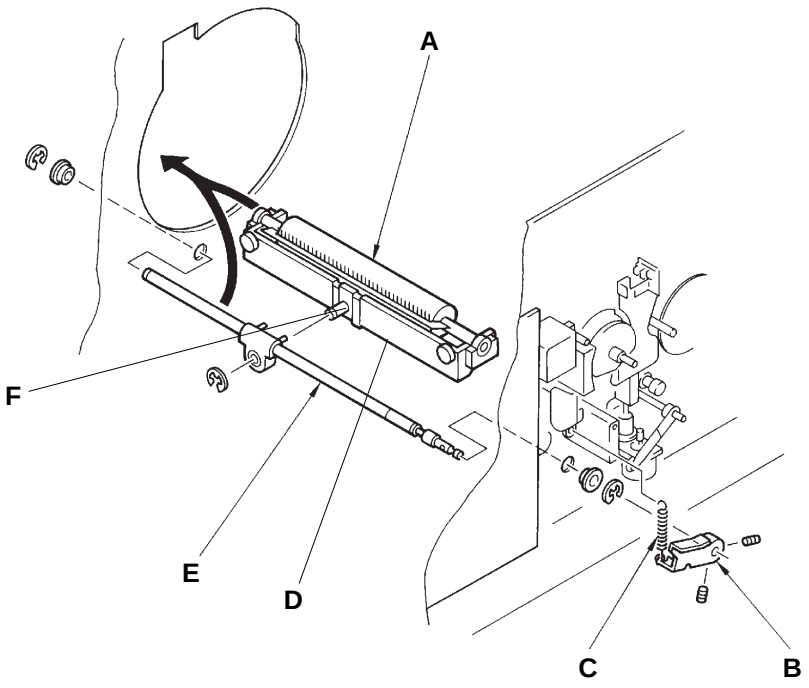
Pressure Shaft
< Removal Procedure >

1. Remove the Pressure lever, referring above.
2. Take out the Drum from the machine.
3. Remove the Paper receiving tray and Suction cover plate.
4. Remove the mounting screws on the Suction unit and pull out the unit a little to make space for removal of the Pressure shaft.
5. Remove E rings and collars at both ends of the Pressure shaft, and then take out the shaft from the opening for the Drum installation.
6. Remove an E ring on the Center shaft of the Pressure roller support and separate the Pressure roller support from the Pressure shaft.

- Adjustments after Assembly -

- Installation Position of Pressure Lever (page 6A-1)
- Resting Position of Pressure Lever (page 6A-3)
- Position of the Pressure Sensor Disc (page 6A-7)
- Position of the P Disc (page 4A-5)

A: Pressure roller
B: Pressure lever
C: Pressure lever spring
D: Pressure roller support
E: Pressure shaft
F: Center shaft



4. Pressure Roller

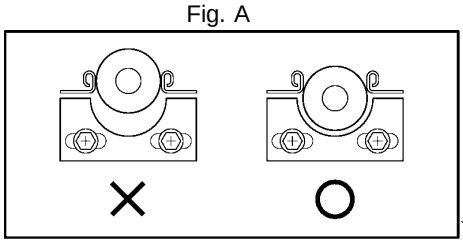
< Removal Procedure >

1) Take out the Drum from the machine and turn OFF the power.
2) Pull up the sfaft of the Pressure roller and take it out.

- Precautions in Assembly-

- When reattaching the Pressure roller to the Pressure support, fit the upper and lower positions, and left and right positions of the bearing as shown in Fig. A and Fig. B.
- If the bearing is not insert firmly as marked with X in Fig. A, the Pressure roller will contact only on one side, causing a leakage of ink and breakage of the Drum body.
- Clean the surface of the Pressure roller periodically because paper powder, ink, etc. adhere. *After cleaning, apply powder to the pressure roller.

Fig. A



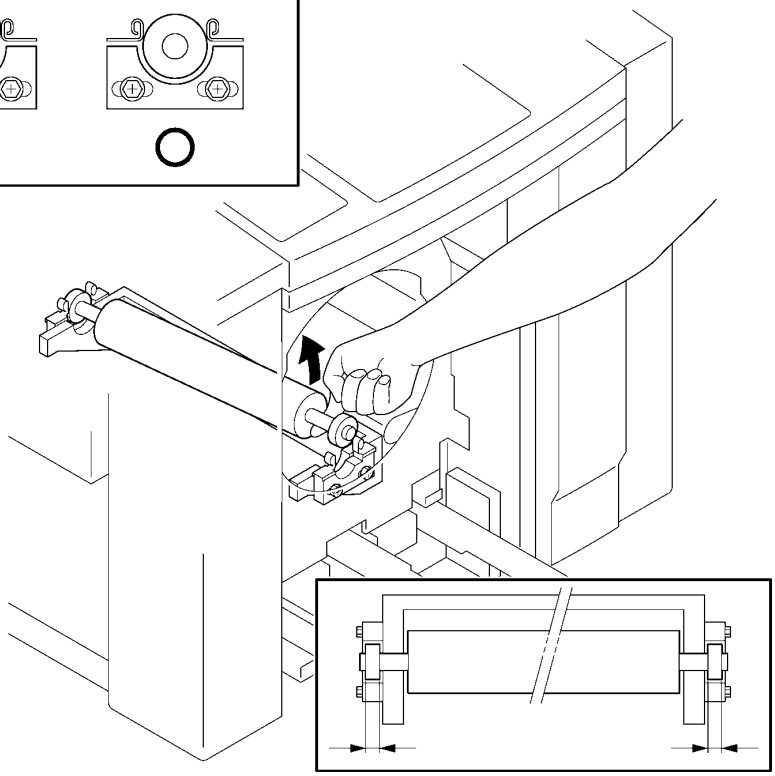


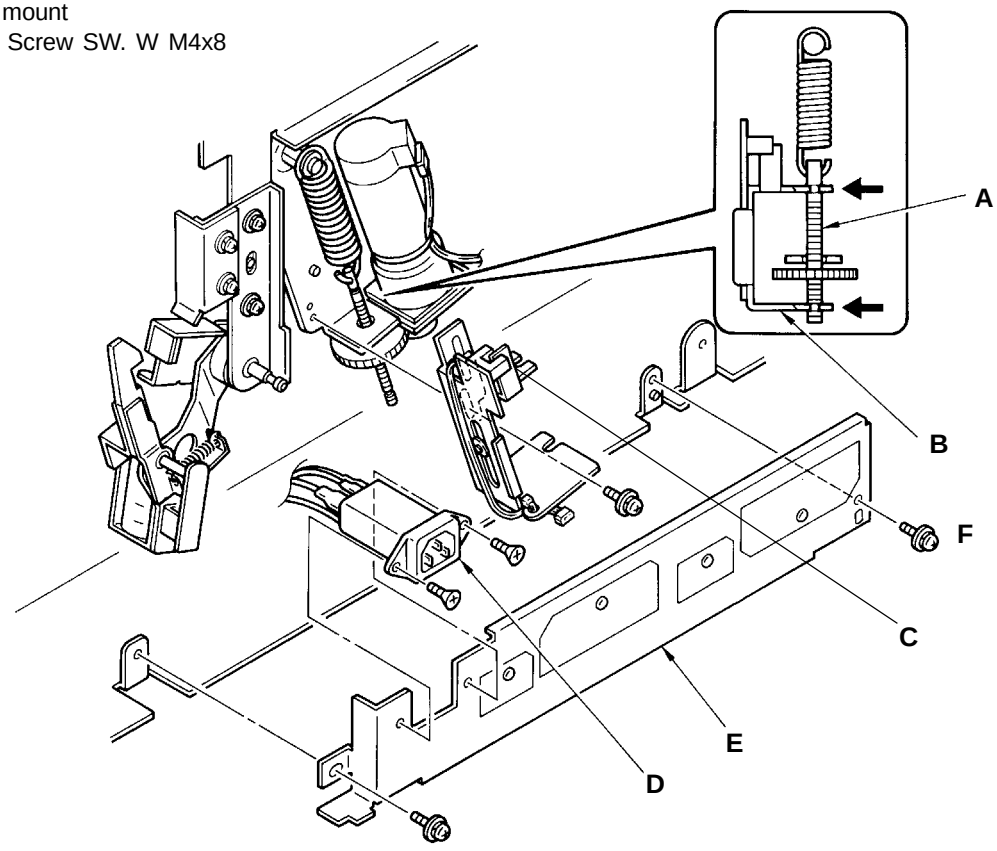
Fig. B

ADJUSTMENT

1. Installation Position of Pressure Lever

1. Put a blank master on the Drum by selecting confidential master making.
2. Remove the Back cover and set the Drum at the home position (Position A).
   Turn OFF the power.
3. Insert a bar into the hole on the end of the Pressure shaft and turn the shaft counter-clock-wise with the bar to press the Pressure roller closely against the Drum.
   Keeping the Pressure shaft in this condition and pushing the Hook lever against the Pressure lever as shown in the figure on the next page, check if the distance from the top edge of the angular hole of the Hook lever to the top face of the bent part of the Pressure lever is **4.5 to 5.5mm**.
4. If not, adjust the installation position of the Pressure lever as follows.
   1) Remove two mounting screws on the Inlet terminal and let it free.
   2) Remove two mounting screws on the Connector mount and then remove it.
   3) Disconnect the connector of the Pressure control sesnor.
      Remove the securing screw on the Pressure control sesnor bracket and then remove the bracket.

A: Print pressure adjustment screw
B: Pressure control sensor bracket
C: Pressure control sensor
D: Inlet Terminal
E: Connetor mount
F: Pan-head Screw SW. W M4x8



4) Loosen the allen screws that secure the Pressure lever on the Pressure shaft.
5) Push down the Pressure lever and hold it at the position where the distance from the top edge of the angular hole of the Hook lever to the top face of the bent part of the Pressure lever is **4.5 to 5.5mm** when measured with the Hook lever pushed against the Pressure lever.

[IMPORTANT]
Hold the Pressure lever pressing it against the Pressure hook.

6) Insert a bar (a hexagonal wrench) into the hole on the end of the Pressure shaft, and turn the shaft counter-clockwise with the bar to press the Pressure roller closely against the Drum.
7) Keeping the Pressure lever and Pressure shaft in the conditions described above, tighten the allen screws to secure the Pressure lever on the Pressure shaft.

- Checks after Installation -

- Check whether the Pressure lever has been shifted to the near side.
- When the Pressure lever is manually pushed down and the Pressure roller stops in contact with the drum, check whether the distance is 4.5 to 5.5 mm.

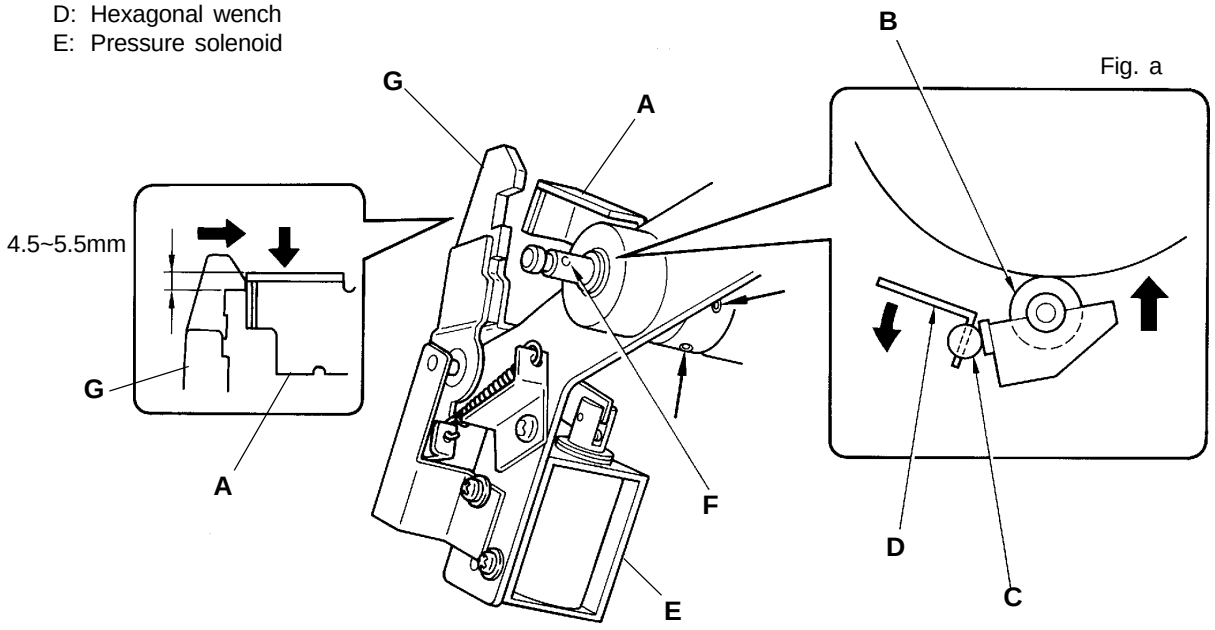
- Results of Misadjustment -

- If the Pressure lever is installed too low (the distance is **much less than 4.5mm**); the pressure of the Pressure roller will be too weak against the Drum, which causes printed to be light.
  Or the Pressure roller will not contact the Drum with enough pressure to transport a sheet through the print section, causing paper jam.
- If the Pressure lever is installed too high (the distance is **much more than 5.5mm**); the pressure of the Pressure roller will be too high against the Drum, which causes much stress on the Pressure links and Drum body and shortens their life.

Caution:
Insert the hexagonal wrench into the pressure shaft and turn in counterclockwise to apply a pressure to the pressure roller. If the wrench is not properly set, it may be broken even if you do not apply a strong force. Set as shown in Fig. a.

A: Pressure lever
B: Pressure roller
C: Pressure shaft
D: Hexagonal wench
E: Pressure solenoid
F: Pressure shaft
G: Hook lever

Fig. a



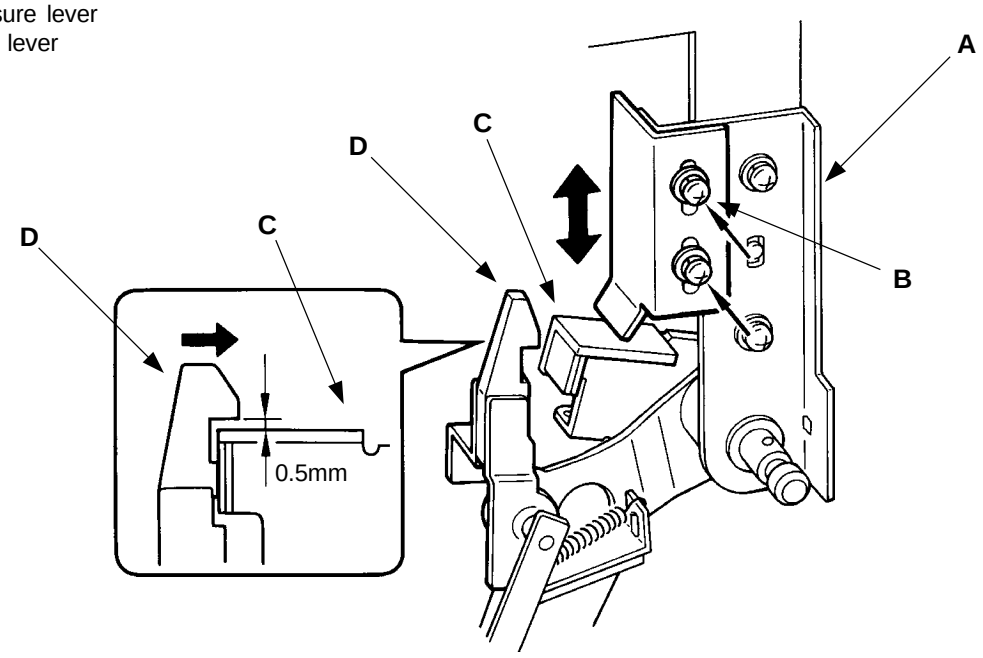
2. Resting Position of Pressure Lever (Pressure Roller)

1. Remove the Back cover.
2. Rotate the Drum by pressing **SW1** on the **System PCB** until the Hook lever comes up to the highest position.
   Turn OFF the power.
3. Push the Hook lever to the right and check if the distance from the top edge of the angular hole of the Hook lever to the top face of the bent part of the Pressure lever measures **0.5mm**.
4. If the specified value is not met, loosen two setscrews of the Pressure shaft face plate C and move it up/down to make adjustment.

- Results of Misadjustment -

- If the bent part of the Pressure lever is rested higher than the top edge of the angular hole of the Hook lever (the Pressure roller is rested too low);
  the Hook lever will not engage with the Pressure lever when the Pressure solenoid is activated ON, preventing the Pressure roller from lifting up to the Drum, which causes paper jam under the Drum.
- If the bent part of the Pressure lever is rested on the same level of the top edge of the angular hole of the Hook lever (the Pressure roller is rested a little too low);
  the Hook lever will not disengage from the Pressure lever when the Pressure solenoid is deactivated.
- If the bent part of the Pressure lever is rested much lower (**much more than 0.5mm**) than the top edge of the angular hole of the Hook lever (the Pressure roller is rested too high);
  the Pressure roller will contact the Clamp section on the Drum, which can damage the Clamp section and/or the Pressure roller.

A: Pressure shaft face plate BII
B: Pressure shaft face plate C
C: Pressure lever
D: Hook lever



3. Position of Pressure Solenoid

1. Remove the Back cover.
2. Rotate the Drum by pressing **SW1** on the **System PCB** until the Hook lever comes up to the highest position.
3. Start up Test mode **No.68** to activate the Pressure solenoid and engage the Hook lever with the Pressure lever.
4. Check if the gap between the deepest point of the angular hole of the Hook lever and the edge of the bent part of the Pressure lever measures **0.8mm**.
5. If not, adjust the position of the Pressure solenoid as follows.
   A3 Model:
   Rough adjustment (Position of Pressure Solenoid)
   1) Start up Test mode No.68
   2) Loosen two mounting screws of the Pressure solenoid.
   3) Move up or down the Pressure solenoid until the gap measures 0mm.
   4) Tighten the mounting screws to secure the Pressure solenoid.
   Fine adjustment (Position of Pressure hook stopper)
   5) Loosen a mounting screw of the Pressure hook stopper.
   6) Move up the stopper until the gap measures 0.8mm.

   Other Model:
   1) Loosen two mounting screws of the Pressure solenoid.
   2) Move up or down the Pressure solenoid.
   3) Tighten the mounting screws to secure the Pressure solenoid and check the gap.
   4) Repeat the procedures in the steps 1) to 3) above until the gap measures 0.8mm.

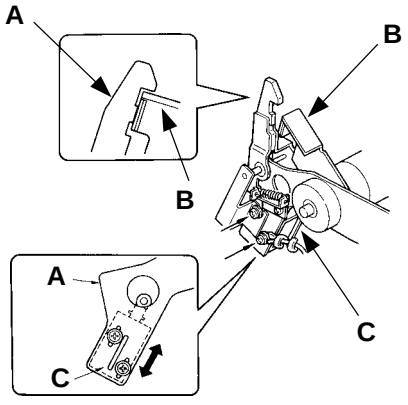
- Precautions in Adjustment -

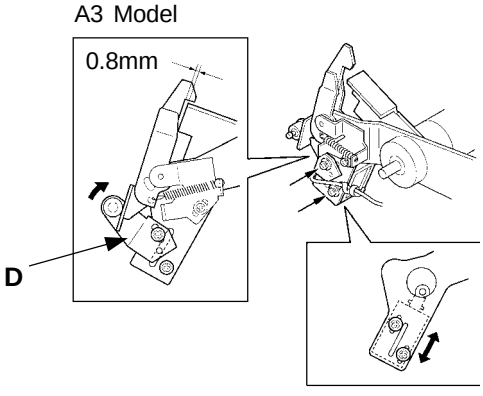
- Perform printing at the highest and lowest speeds and confirm that the Hook lever closely engages with the Pressure lever during printing.

- Results of Misadjustment -

- If the Hook lever engages with the Pressure lever too shallow (the gap is **much more than 0.8mm**);
  the Hook lever will slip off the Pressure lever, preventing the Pressure roller from lifting up to the Drum, which causes paper jam under the Drum.
  This condition may eventually cause damages to the Hook lever and Pressure lever.
- If the Hook lever engages with the Pressure lever too deep (the gap is **none** and the Pressure solenoid is positioned too low);
  the plunger of the Pressure solenoid will not be pulled in when the solenoid is activated ON, preventing the Pressure roller from lifting up to the Drum, which causes paper jam under the Drum.

A: Hook lever C: Pressure solenoid
B: Pressure lever D: Pressure hook stopper





4. Resting Position of Hook Lever

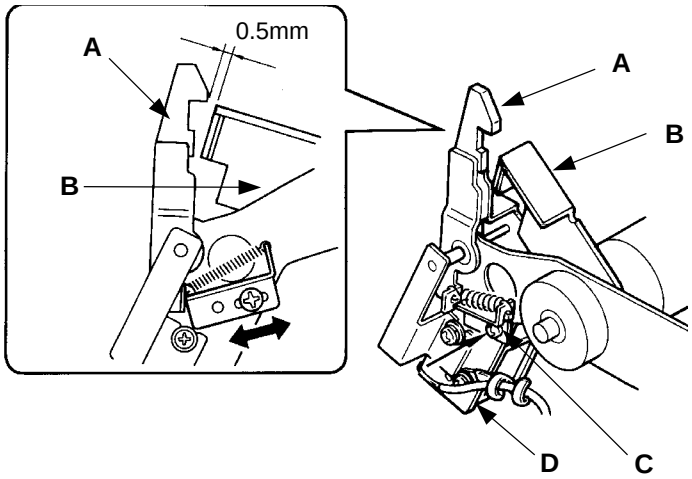
1. Remove the Back cover.
2. Rotate the Drum by pressing **SW1** on the **System PCB** until the top edge of the angular hole of the Hook lever is on a level with the top face of the bent part of the Pressure lever.
   Turn OFF the power.
3. Check if the minimum gap between the Hook lever and the edge of the bent part of the Pressure lever measures **0.5mm**.
4. If not, adjust the resting position of the Hook lever as follows.
   1) Loosen the mounting screw on the Hook spring plate attached on the Pressure hook.
   2) Move the Hook spring plate to the left or right to adjust the gap to 0.5mm.
   3) Tighten the mounting screw to secure the Hook spring plate.

- Precautions in Adjustment -

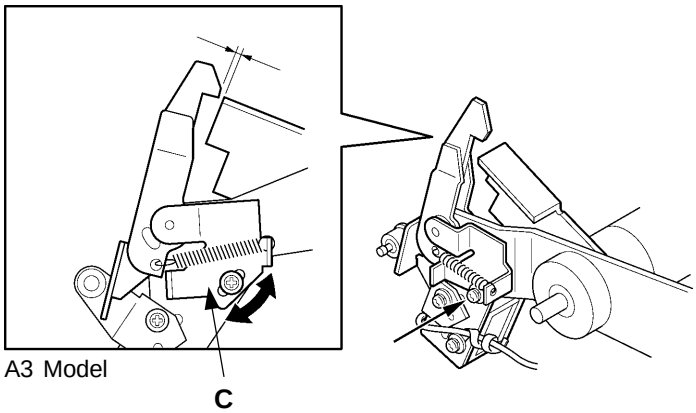
- Match a boss on the Pressure hook with a hole on the Hook spring plate when securing the plate.

- Results of Misadjustment -

- If the gap is too narrow **(much less than 0.5mm**);
  the Hook lever will catch the Pressure lever when the Pressure solenoid is not activated ON, keeping the Pressure roller pressed against the Drum.
- If the gap is too wide **(much more than 0.5mm**);
  the Hook lever will not engage with the Pressure lever when the Pressure solenoid is activated ON, preventing the Pressure roller from lifting up to the Drum, which causes paper jam under the Drum.



A: Hook lever
B: Pressure lever
C: Hook spring plate
D: Pressure solenoid



A3 Model

LED PRP Pressure control sensor
– Light up when light path is opened
Test Mode No.53 Pressure control sensor
– Short interval beeps when light path is blocked

5. Standard Pressure Position

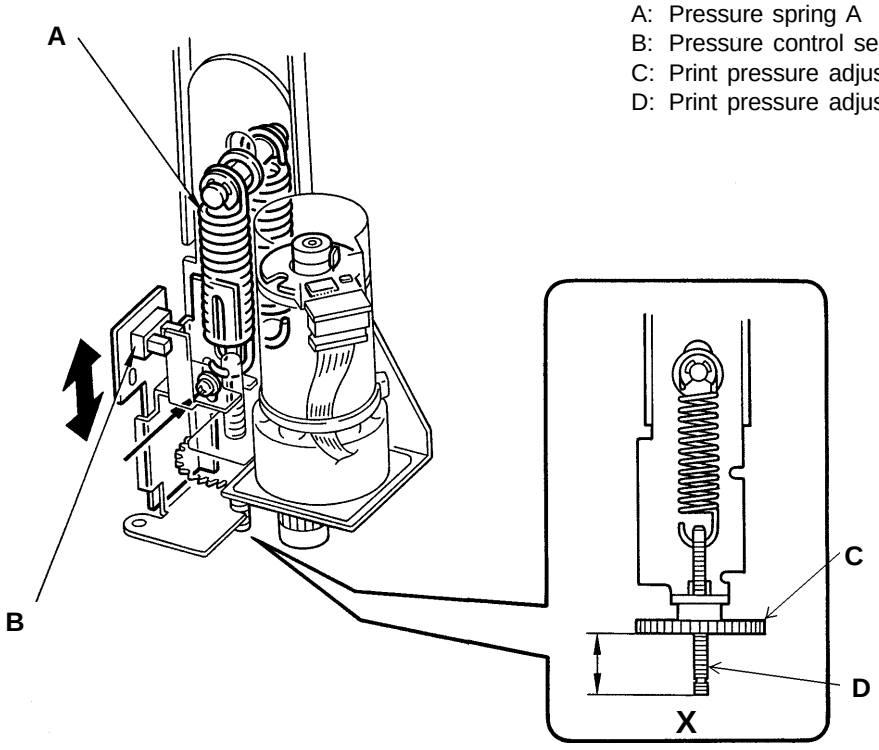
1. Pull out the Drum and Remove the Back cover.
2. Turn ON the power.
   The Print pressure is automatically set at the initial position.
3. Turn OFF the power.
4. Measure the **[X]**, i.e. length from the end of the Print pressure adjustment screw to the bottom face of the Print pressure adjustment gear.
5. The measurement should close to the value on the chart to the right.
6. If not, loosen the mounting screw of the Pressure control sensor bracket, as indicated by an arrow in the sketch below, and adjust the position.
7. Turn ON the power again and measure the **[X]** to confirm that the correct value as indicated in the chart is given.

Drum Type	Standard Value
Legal / A4	X = 17.5 mm
B4	X = 18.5 mm
Ledger / A3	X = 18.5 mm

- Phenomenon -

Too high a pressure results in too dark print. It also gives a burden to the drum, resulting in a leakage of ink or cracks on the Drum. On the contrary, too low a pressure results in too light print, causing a leakage of ink.

A: Pressure spring A
B: Pressure control sensor
C: Print pressure adjustment gear
D: Print pressure adjustment screw



- At the factory, the machines are adjusted by special Jig to position the Pressure control sensor. Some machines are not within the above-mentioned reference range. The reference range is only a service guideline.

6. Position of Pressure Sensor Disc

1. Remove the Back cover.
2. Set the Drum at the home position (Position A).
   Turn OFF the power.
3. In this state, make sure that two resisterline marking on the Pressure sensor disc are aligned with the Pressure detection sensor.(See Fig. a)
4. If not, first check if the hole on the Main shaft face plate is aligned with the counterpart on the Pressure cam
   If it is not aligned, adjust the arrangement of the Pressure cam.
5. If they are dislocated, loosen the allen screw of the Pressure sensor disc, align the alignment hole so that the two resisterline marking will be located above and below the Pressure detection sensor, and tighten the screw to fix.

- Precautions in Adjustment -

- Make sure that the Pressure sensor disc doesn't get contact with the inner surface of the Pressure detection sensor at any position by rotating the Pressure sensor disc with a press of SW1 on the System PCB.

- Results of Misadjustment -

- If the Pressure sensor disc is incorrectly positioned;
  the paper path through the Paper receiving sensor 1 will be checked out of time, which misleads the machine to assume that a printed sheet has jammed in the paper ejection section when no sheet actually jamms there.
  As a result, “PAPER JAM UNDER DROM PULL OUT DRUM” will be displayed on the operation panel.

A: Pressure detection sensor
B: Alignment hole
C: Pressure sensor disc
D: Alignment hole of Pressure cam
E: Alignment hole on Main shaft face plate

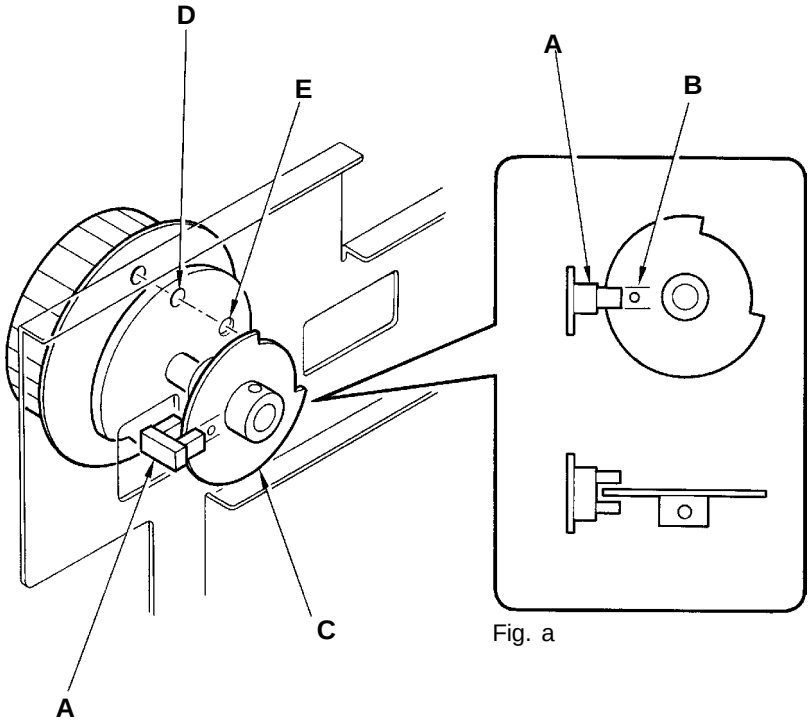


Fig. a

7. Parallelism of Pressure Roller

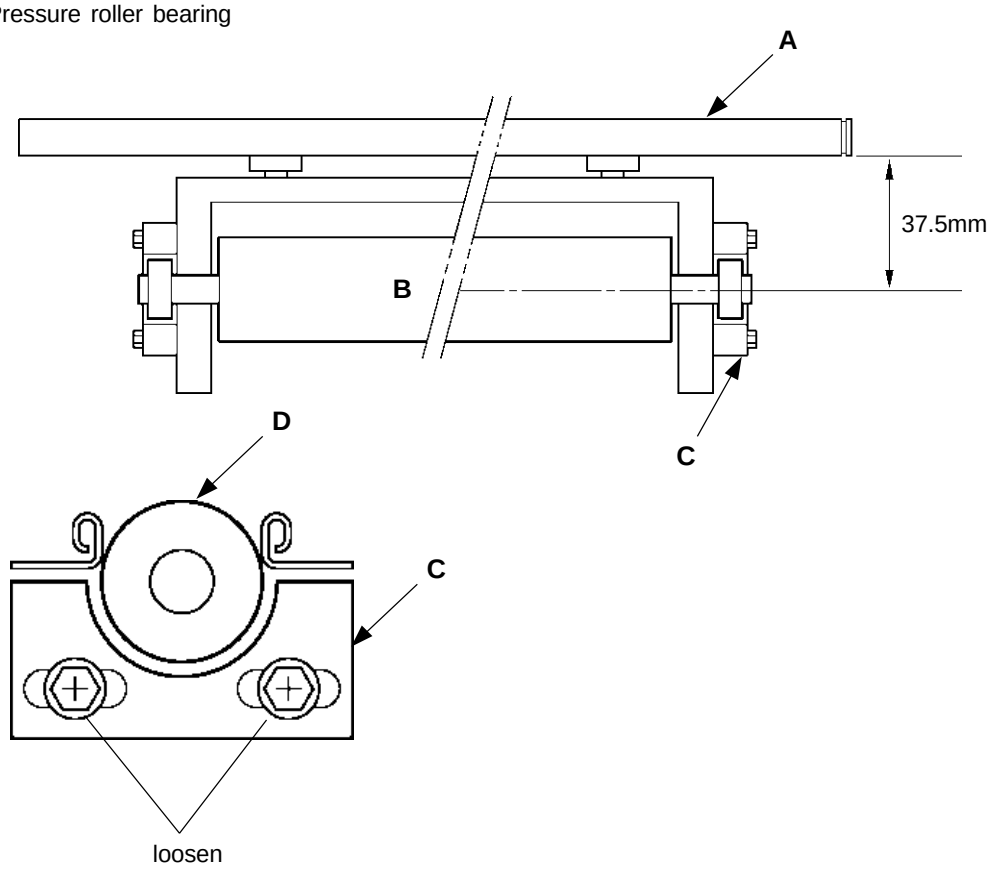
- Checking and Method-

1) Print multiple sheets of paper and check whether the master and screen are shifting toward the drive side or panel side.
2) If they are, make the following adjustment.

- Adjustment-

1) Remove the Pressure shaft assembly(page 6R-3)
2) Check whether the shaft center of the Pressure roller is distanced 37.5 mm(reference value) from the inside of the pressure shaft assembly.
3) If not, loosen the hexagon cross recessed head bolts of the Pressure roller holder to make adjustment.
4) Make sure that the reference value is met on both left and right sides.

A: Pressure shaft assembly
B: Pressure roller
C: Pressure roller support
D: Pressure roller bearing



CHAPTER 7: PAPER EJECTION SECTION

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REMOVAL & ASSEMBLY

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ADJUSTMENT

1. Position of Separator 7A-1
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THEORY OF OPERATION

1. Paper Separation System

- Separation of Paper

A printed sheet is separated from the Drum by the Separator and Separation fan.

- Air Blow from Separator Tip

When the lead edge of a printed sheet sticking to the Drum approaches the Separator, air is blown on its center from the tip of the Separator through the operation of the Separation air pump, which is attached on the Rear side frame. As a result, the lead edge of the printed sheet is blown off from the Drum and led to under the Separator.

- Function of Separation Fan

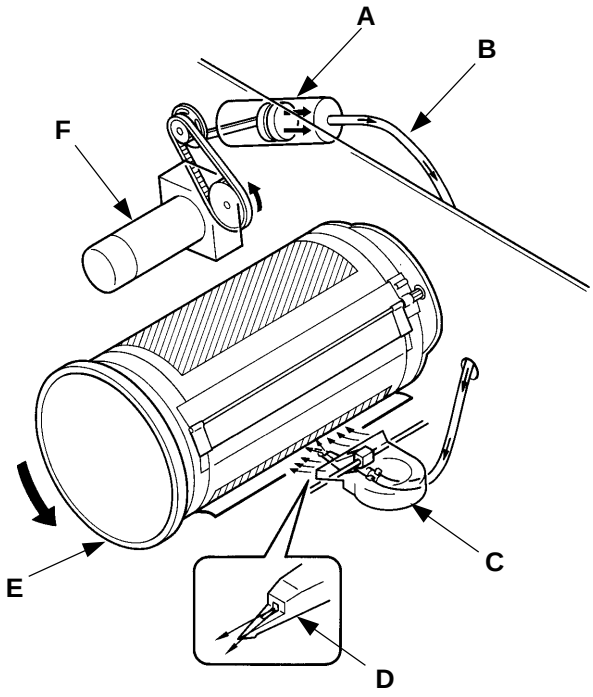
In addition to the air blow from the Separator tip, the Separation fan also blows air on the printed sheet in wide range from above the Separator, assisting the Separator to separate the whole sheet from the Drum.

The air flow rate of the Separation fan can be adjusted with the Memory switch.

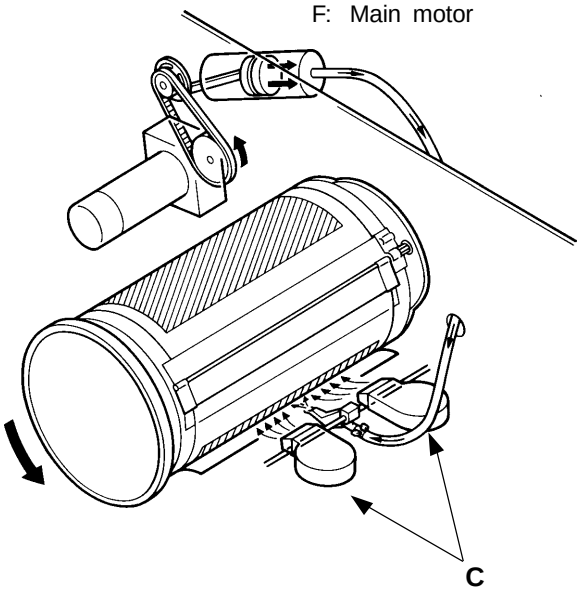
- Operation of Separation Air Pump

The Separation air pump is driven by the Main motor via a belt and send air to the tip of the Separator through a rubber hose once during one rotation of the Drum, to blow air on the lead edge of the printed sheet in time.

A: Separation air pump
B: Rubber hose
C: Separation fan
D: Separator
E: Drum
F: Main motor



A3 machine



B4 machine

Test Mode (memory SW) No.223 Separation Fan Air Flow Rate Adjustment

Memory Switch	0	1	2	3
Power-on Time (%)	100%	70%	50%	30%

2. Separator Positioning System

- Motion of Separator

The Separator, which is mounted on the Separator shaft, is normally at a position close to the Drum to remove a printed sheet.

When the Clamp section of the Drum approaches the Separator, however, the Separator is shifted down off the Drum by the turn of the Separator shaft, which is driven by the Separator lever, in order to provide clearance for the passage of the Clamp section.

- Home Position of Separator

The Separator lever, which is attached at one end of the Separator shaft, has a collar at one end which is held close to the Drum body support (left), and at the other end is kept pressed on the Separator adjustment cam by spring tension. [as shown in Fig. 1]

- Operation of Separator Lever

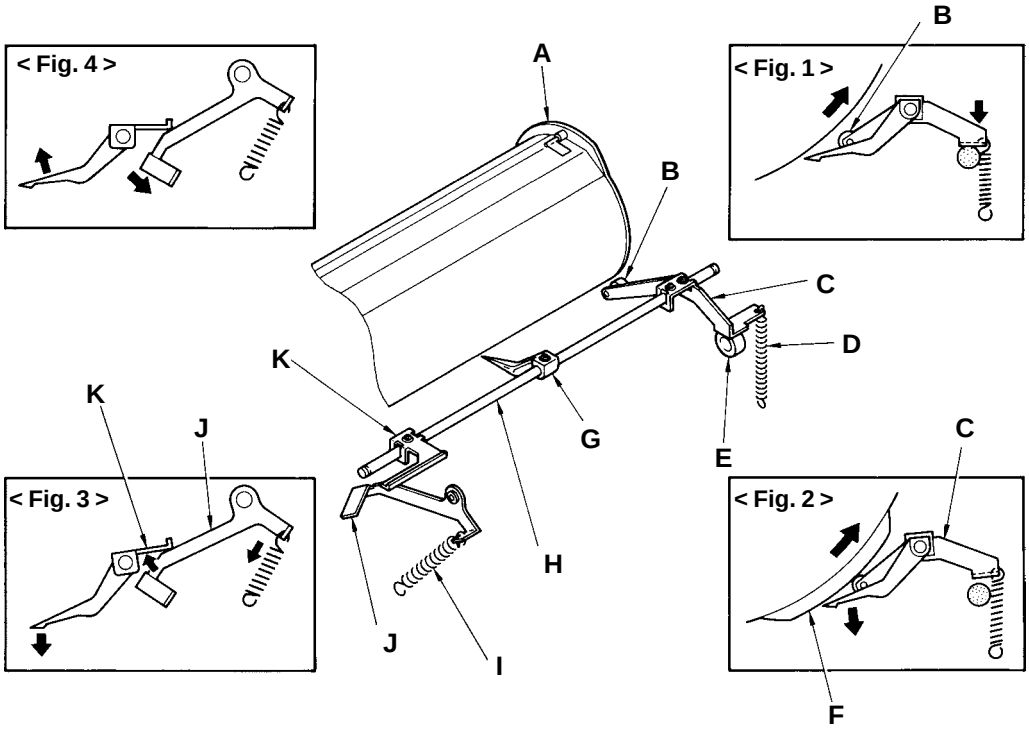
When the Clamp section of the Drum approaches the Separator during rotation, the high point of the Drum body support (left) pushes down the Separator collar, shifting the Separator down off the Drum. [as shown in Fig. 2]

When the Clamp section clears, the Separator is raised close to the Drum again by the spring tension on the Separator lever to remove a printed sheet from the Drum. [as shown in Fig. 1]

- Positioning of Separator in Drum Removal

When the Drum is removed, the Release lever is pulled by the Release spring and turned upward, pushing up the Separator release lever, which is attached at the other end of the Separator shaft. By the shift-up of the Separator release lever, the Separator shaft is turned to lower the Separator off the Drum to avoid damages to the Screen. [as shown in Fig. 3]

When the Drum is locked into position, the Drum frame pushes aside the Release lever, returning the Separator close to the Drum to allow paper separation. [as shown in Fig. 4]



A: Drum body support (left)
B: Separator collar
C: Separator lever
D: Separator spring
E: Separator adjustment cam
F: Drum body support (left)
G: Separator
H: Separator shaft
I: Release spring
J: Release lever
K: Separator release lever

THEORY OF OPERATION

LED RCV1 Paper receiving sensor 1
– Light up when light path is blocked
LED RCV2 Paper receiving sensor 2
– Light up when light path is blocked
Test Mode No.69 Suction fan
No.131 Suction clutch

3. Paper Ejection System

- Paper Transfer

Once a printed sheet is separated from the Drum, it is transported to the Paper receiving tray by the Transfer belts, attracted by the Suction fan.

- Rotation of Transfer Belts

When the Main pulley rotates, driven by the Main motor via the Main belt, the Suction drive junction gear rotates via the Suction drive belt.

The rotation of the junction gear is transmitted to the the Suction gear pulley of the Suction unit via the Suction clutch unit, thus rotating the Suction pulley shaft which drives the Transfer belts to transport printed sheets to the Paper receiving tray.

- Change of Rotation Speed of Transfer Belts

The rotation speed of the Transfer belts is changed in two ways according to the rotation speed of the Drum (print speed), controlled by the Suction clutch.

When the Drum is rotated at a low speed (print speed 1 or 2), the Suction clutch is activated, thus leading the Transfer belts to rotate 1.8 times faster than the Drum to eject printed sheets.

When the Drum is rotated at a high speed (print speed 3, 4 or 5), on the other hand, the clutch is deactivated, thus leading the belts to rotate 1.2 times faster than the Drum.

By accelerating the Transfer belts against the Drum less in high-speed printing in this way, ejected sheets are arranged neatly in the Paper receiving tray in high-speed printing as well.

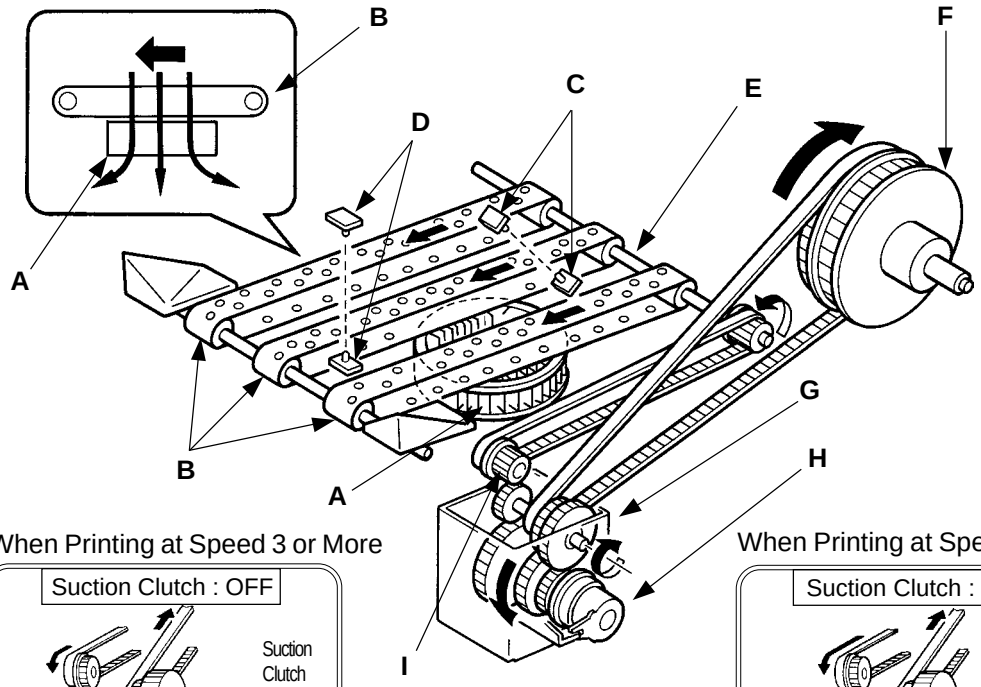
When printing on A3 or Ledger-size paper, however, the Transfer belts are always rotated 1.8 times faster than the Drum regardless of the print speed.

- Function of Suction Fan

The Suction fan, located under the Transfer belts, draws printed sheets onto the Transfer belts for secure paper transfer.

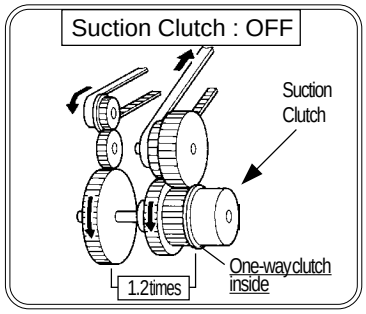
- Paper Transfer Monitoring

The Paper receiving sensors 1 and 2 monitor paper transfer in the paper ejection section to detect paper jams.

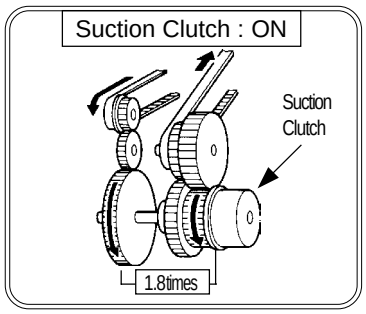


A: Suction fan
B: Transfer belt
C: Paper receiving sensor 1
D: Paper receiving sensor 2
E: Suction pulley shaft
F: Main pulley
G: Suction clutch unit
H: Suction clutch
I: Suction gear pulley

When Printing at Speed 3 or More



When Printing at Speed 2 or Less



Test Mode No.26 Jump wing SW 1
– Short interval beeps when pressed
No. 27 Jump wing SW 2
– Short interval beeps when pressed
No. 80 Wing motor

4. Paper Ejection Guides Auto-setting System

- Basic

The paper ejection guides (Jump wings, Side flaps and Belt roller) are automatically positioned for secure paper ejection according to the size of paper.

- Movement of Paper Ejection Guides

The paper ejection guides (Jump wings, Side flaps and Belt roller) change their positions in three ways according to the opened width of the Side guides on the Paper feed tray and setting of the Paper feed pressure SW.

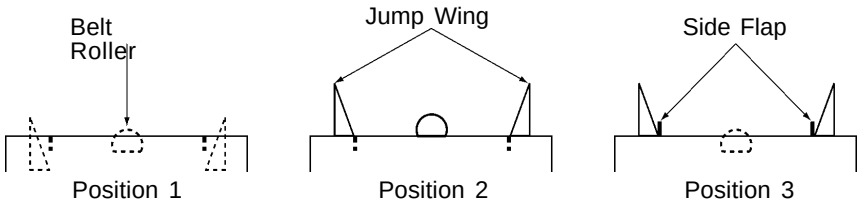
When the Wing motor rotates, the rotation force is transmitted, in the following manner, to the Wing cam shaft, on which the Wing cams, Roller cam and Sw cam are attached.

<Wing motor ➡ Wing motor pulley ➡ Belt ➡ Wing gear ➡ Cam gear ➡ Wing cam shaft>

When the Wing cam shaft rotates, the Wing cams rotate, moving up and down the Jump wings and Side flaps, and the Roller cam does, moving up and down the Belt roller.

- Control of Paper Ejection Guides' Position

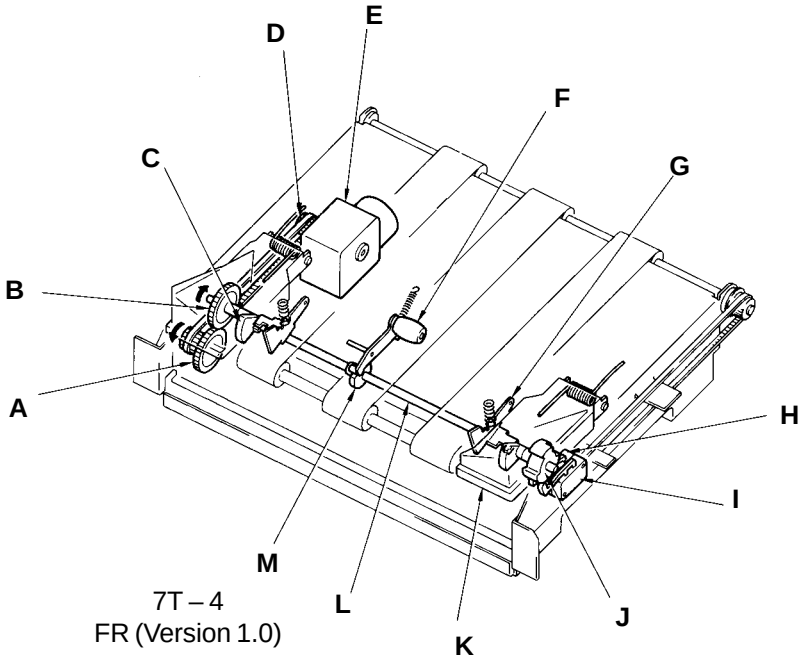
The two switches, i.e. **Jump wing SW1 and SW2**, keep track of the rotation of the SW cam to arrange the paper ejection guides in the following ways according to the size of paper.



Position	Paper Size (Paper Width)	Paper Feed Pressure Setting	Jump Wing SW		Jump Wing	Belt Roller	Side Flap
Position 1	A3	Card	Released	Released	Down	Down	Down
Position 2	A3	Normal	Pressed	Released	Up	Up	Down
	A4 to A3 (Ledger to letter)	Card/ Normal					
Position 3	Less than A4	Card/ Normal	Released	Pressed	Up	Down	Up

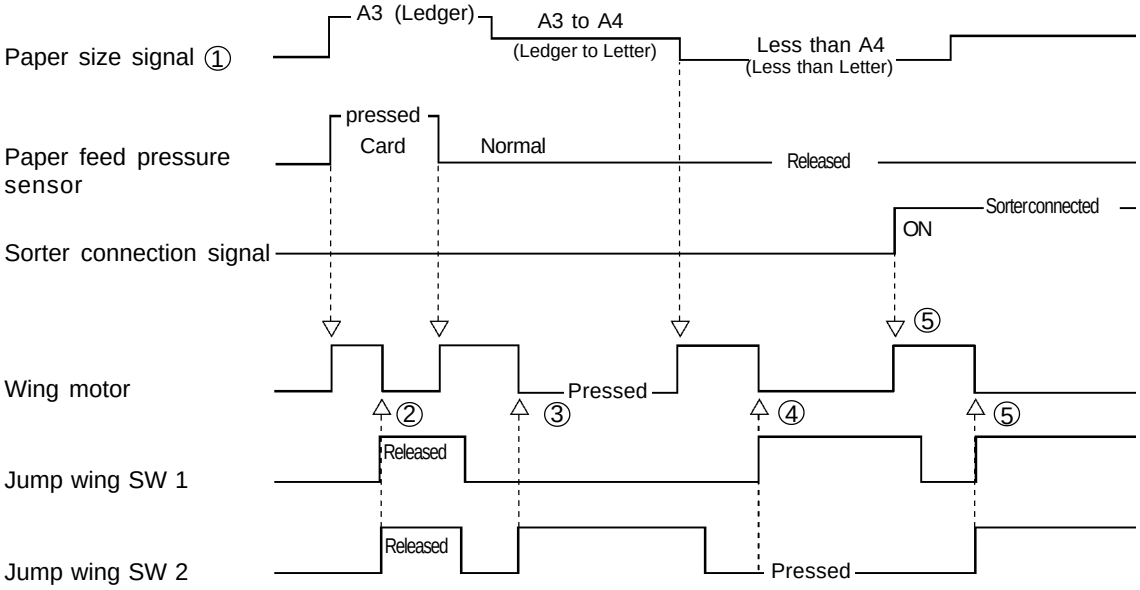
- When the sorter connection signal is ON(TM2500 connected), the position-1 is selected regardless of the paper size.
- Can be fixed at the position of the Jump wing in the user mode.

A: Wing gear
B: Cam gear
C: Wing cam
D: Wing motor pulley
E: Wing motor
F: Belt roller
G: Side flap
H: Jump wing SW 2
I: Jump wing SW 1
J: SW cam
K: Jump wing
L: Wing cam shaft
M: Roller cam



- Timing Chart -

Paper Ejection Guides Auto-setting System



① The Paper size signal is determined by the information from the Paper feed tray, i.e. Paper size potentiometer and Paper size det. sensor.
② If the paper size is A3 or Ledger, the Wing motor rotates until the Jump wing SW1 and SW2 are released.
③ If the paper size is A3 and the Paper feed pressure switch has been set to “NORMAL,” or if the paper size is less than A3 or A4 or more, the wing motor will be turned on until the jump wing SW1 is pressed and the Jump wing SW2 is released.
④ If the paper size is less than A4 (or Letter), the Wing motor rotates until the Wing SW1 is released and SW2 is pressed.
⑤ If the Sorter connection signal is ON, i.e. TM2500 or TM5000 is connected, the Wing motor rotates until the Jump wing SW1 and SW2 are released, regardless of the paper size.

* If neither the Jump wing SW1 nor SW2 is actuated ON **within 5 seconds** after the Wing motor is activated , the machine assumes the Wing motor has locked and displays the error code **[T 20]**.
* If either the Jump wing SW1 or SW2 is kept actuated ON **for 5 seconds** since the Wing motor is activated , the machine assumes the Wing motor has locked and displays the error code **[T 20]**.

T20(Wing Motor Lock)
• Jump wing SW1 not turned on/off • Jump wing SW2 not turned on/off

5. Paper Receiving System

- Precision Stacking Tray

The Receiving tray paper guides are equipped with two arrays of flaps which are weighted square plates. These are called "Paper Arrangers".

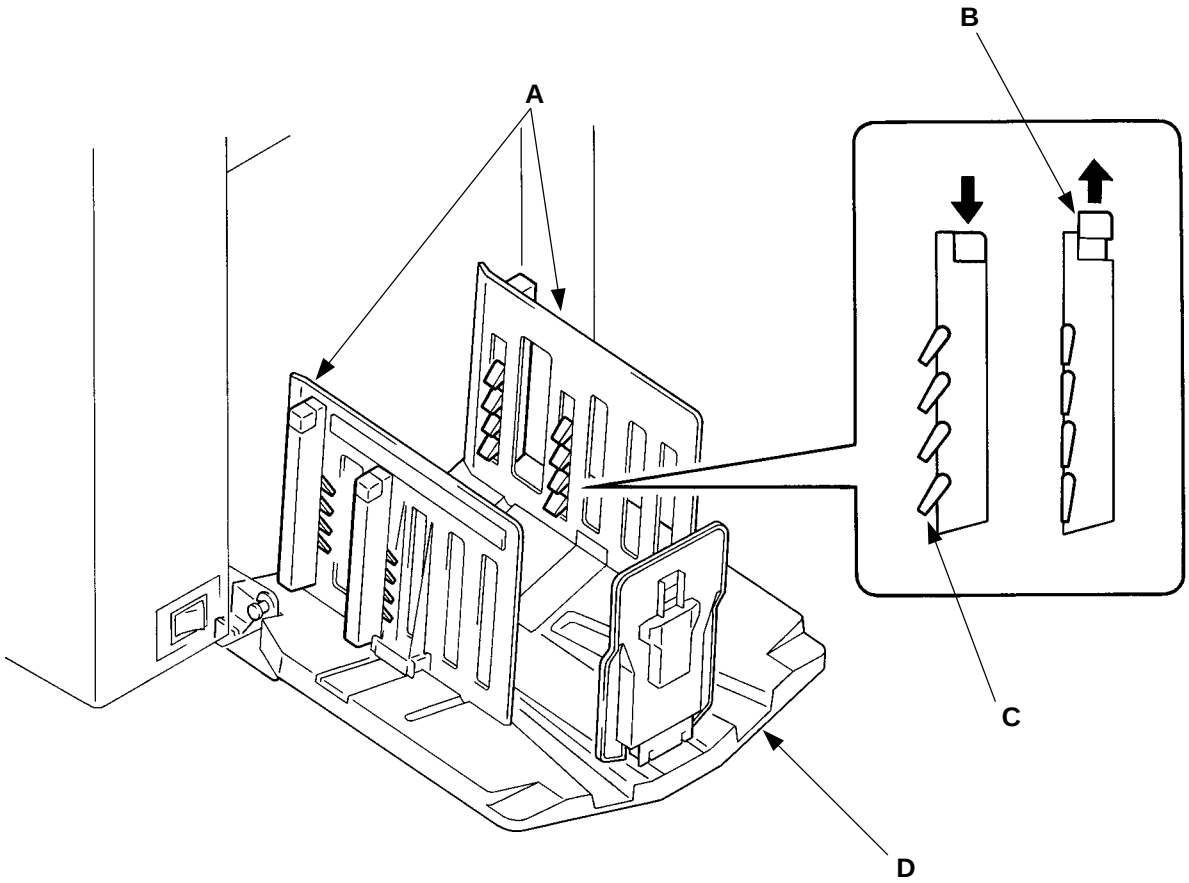
The Paper arrangers lead ejected sheets, which mostly curl in a mound shape, to float down on the V-shaped Paper receiving tray in a bowl shape. As a result, ejected sheets are accumulated neatly on the Paper receiving tray with less set-offs.

- Opening / Closing the Paper Arrangers

The Paper arrangers are opened and closed by a push and a pull of the Paper arranger knob.

- Paper Back Stop

The paper back stop cushion can be moved up/down, depending on the type of printing paper.



A: Receiving tray paper guide
B: Paper arranger knob
C: Paper arrange
D: V-shaped paper receiving tray

REMOVAL & ASSEMBLY

1. Separator

< Removal Procedure >

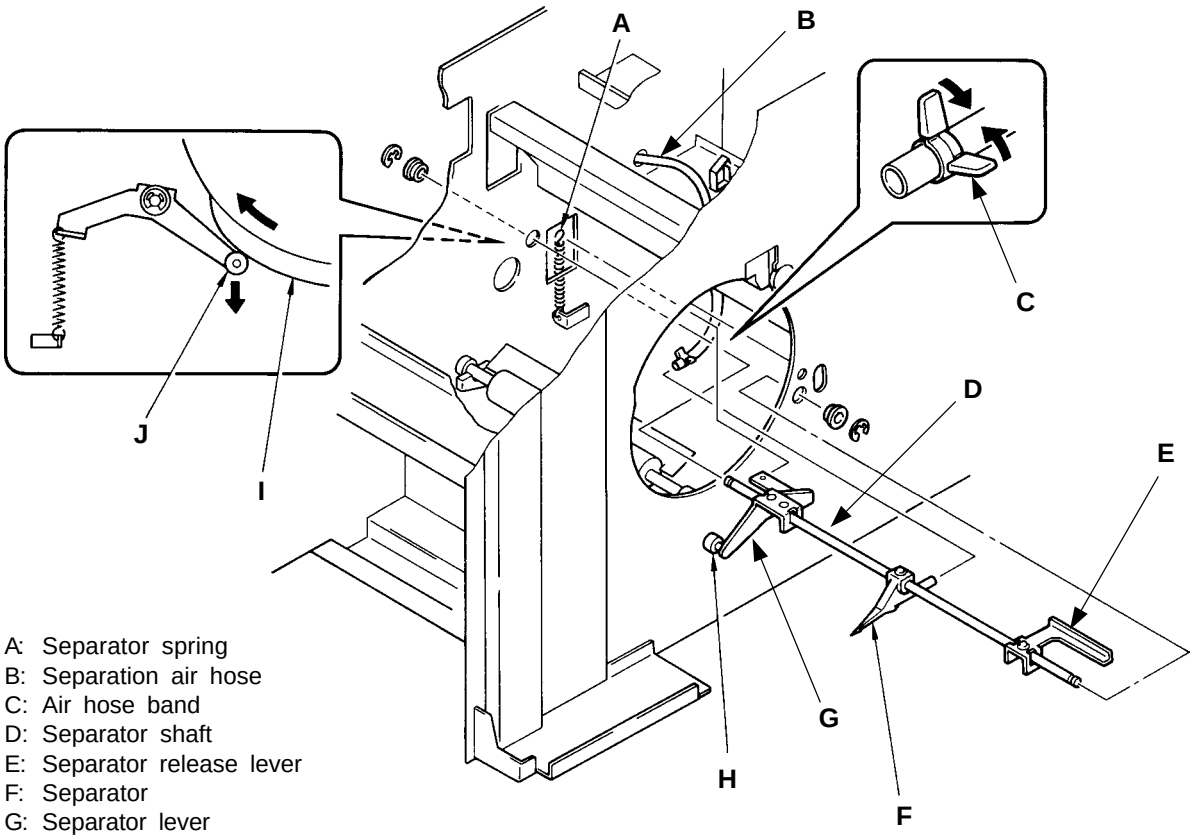
1. Take out the Drum from the machine and turn OFF the power.
   Remove the Back cover.
2. Unhook the Separator spring from the Separator lever (at the upper point).
3. Remove E rings and metal bearings from both ends of the Separator shaft.
4. Pinch the knobs of the Hose band on the Separation air hose and shift the band upwards.
   Remove the Separation air hose from the Separator.
5. Take out the Separator ass'y from the opening for the Drum installation.

- Precautions in Assembly -

- Check that the Separator collar gets in contact with the high (protruding) part of the Drum body support (left) at the middle as indicated in the figure below, by rotating the Drum with a press of SW1 on the System PCB.

- Adjustment after Assembly-

- Check the position of the Separator after assembly and, if required, adjust it.
  (Refer to the page 7A-1.)



A: Separator spring
B: Separation air hose
C: Air hose band
D: Separator shaft
E: Separator release lever
F: Separator
G: Separator lever
H: Separator collar
I: Drum body support (left)
J: Separator collar

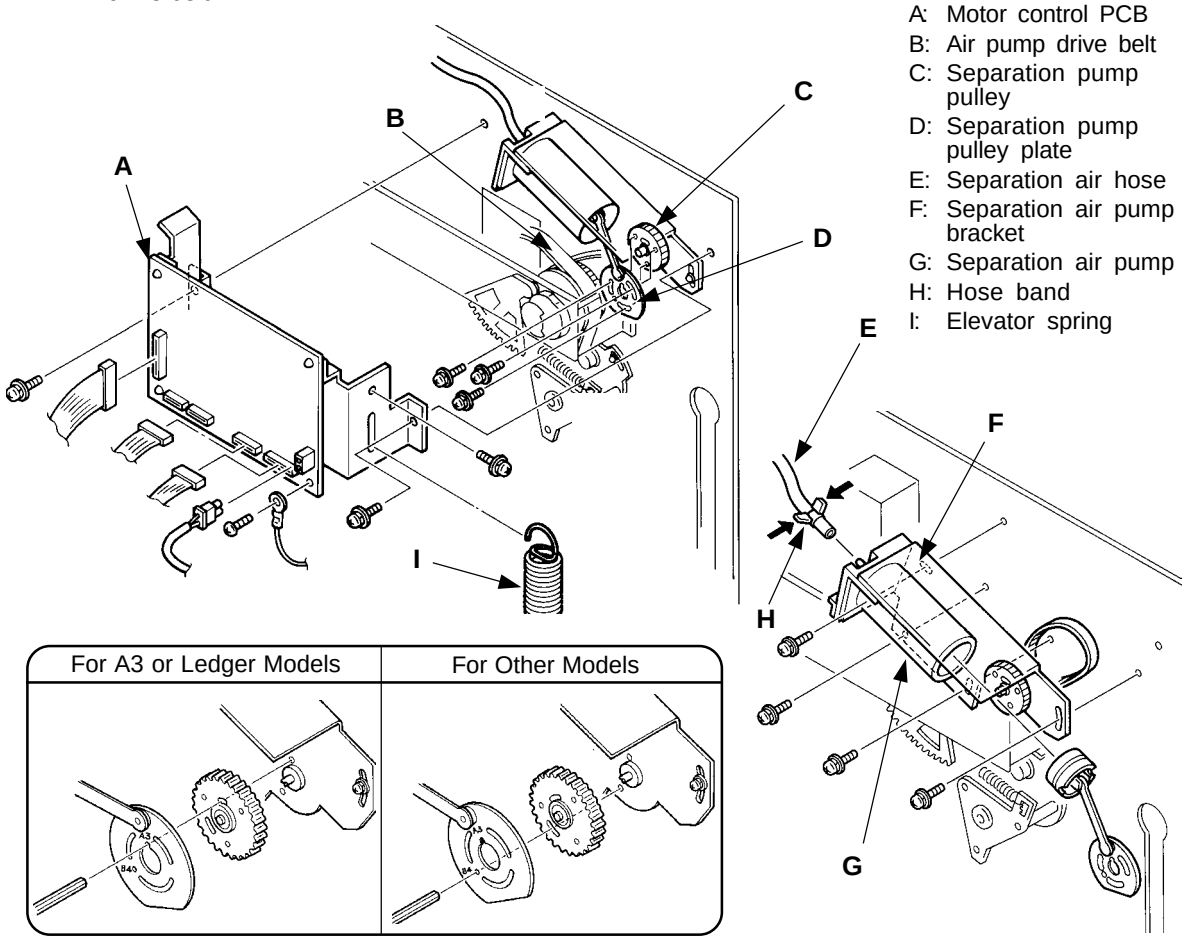
2. Separation Air Pump

< Removal Procedure >

1. Move up the Paper feed tray, set the Drum to the Position A, turn off the power, and remove the Back cover.
2. Remove the Elevator spring from the Motor control PCB bracket.
3. Disconnect the connectors from the Motor control PCB, remove three mounting screws of the Motor control PCB bracket and remove the bracket with the Motor control PCB attached.
4. Remove three securing screws on the Separation pump pulley plate and separate the plate from the Separation pump pulley.
5. Remove four mounting screws of the Separation air pump bracket and remove the Separation air pump with the bracket attached.
6. Disengage the Air pump drive belt from the Separation pump pulley.
7. Pinch the knobs of the Hose band on the Separation air hose and shift the band upwards. Remove the Separation air hose from the Separation air pump.

- Precautions in Assembly -

- When securing the Separation pump pulley plate onto the Separation pump pulley, be sure to align the notch or hole on the pulley plate with the counterpart on the Separation air pump bracket.
  For A3 or Ledger model, use the alignment notch maked "A3" on the pulley plate, while for other models, use the alignment hole marked "B4" on it. (Refer to the figures below.)
- When securing the Separation air pump bracket, push it up to apply tension to the Air pump drive belt.



A: Motor control PCB
B: Air pump drive belt
C: Separation pump pulley
D: Separation pump pulley plate
E: Separation air hose
F: Separation air pump bracket
G: Separation air pump
H: Hose band
I: Elevator spring

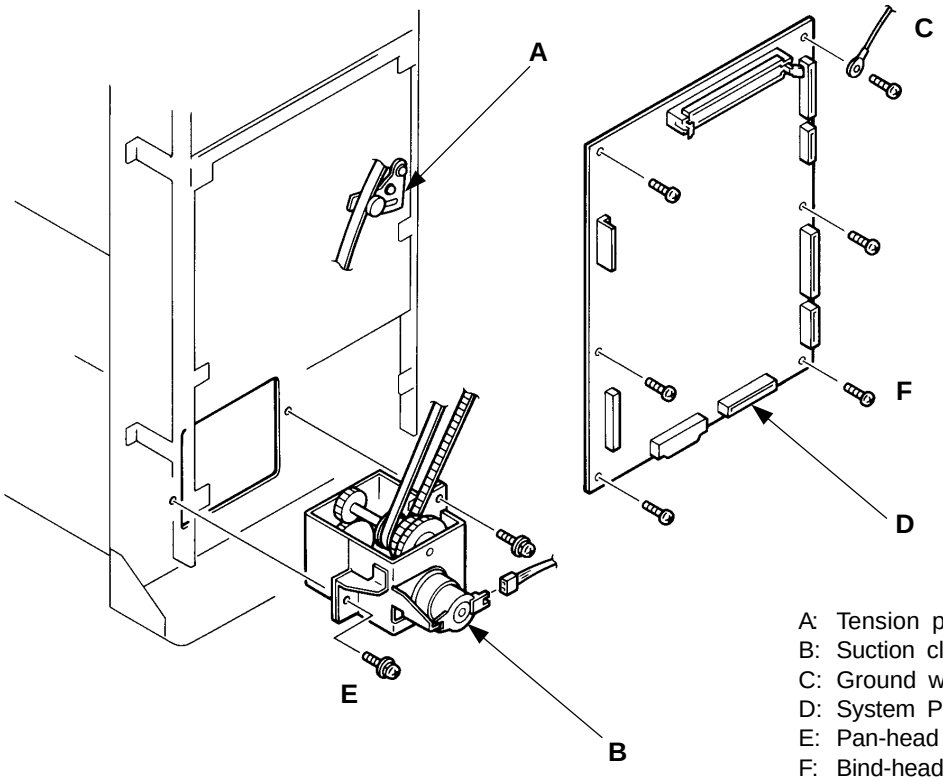
3. Suction Clutch Unit

< Removal Procedure >

1. Turn OFF the power and remove the Back cover.
2. Disconnect the connectors on the System PCB, remove 6 mounting screws of the PCB and remove the PCB.
3. Disconnect the connector of the Suction clutch, remove two mounting screws of the Suction clutch unit and remove the unit from the Side frame.

- Precautions in Assembly -

- Adjust the position of the Suction drive belt tensioner to apply tension to the belt.
- When attaching the System PCB, use the upper right screw to fix the ground wire together.



A: Tension pully
B: Suction clutch unit
C: Ground wire
D: System PCB
E: Pan-head Screw SW. W M4x8
F: Bind-head Screw M3x6

4. Suction Clutch

- Disassembly

1. Turn off the power and remove the Suction clutch unit(see the previous page).
2. Remove three mounting screws of the Suction clutch unit.
3. Remove an E ring at the top of the Suction clutch shaft and slide the Suction clutch off the shaft.

- Precautions for Reassembly

- Pay attention to the direction of the Low-speed gear(see the figure below).
- Apply grease to the Idler gear.
- Hook the claw of the Suction clutch onto the hook of the Clutch cover assembly(see Fig. a).

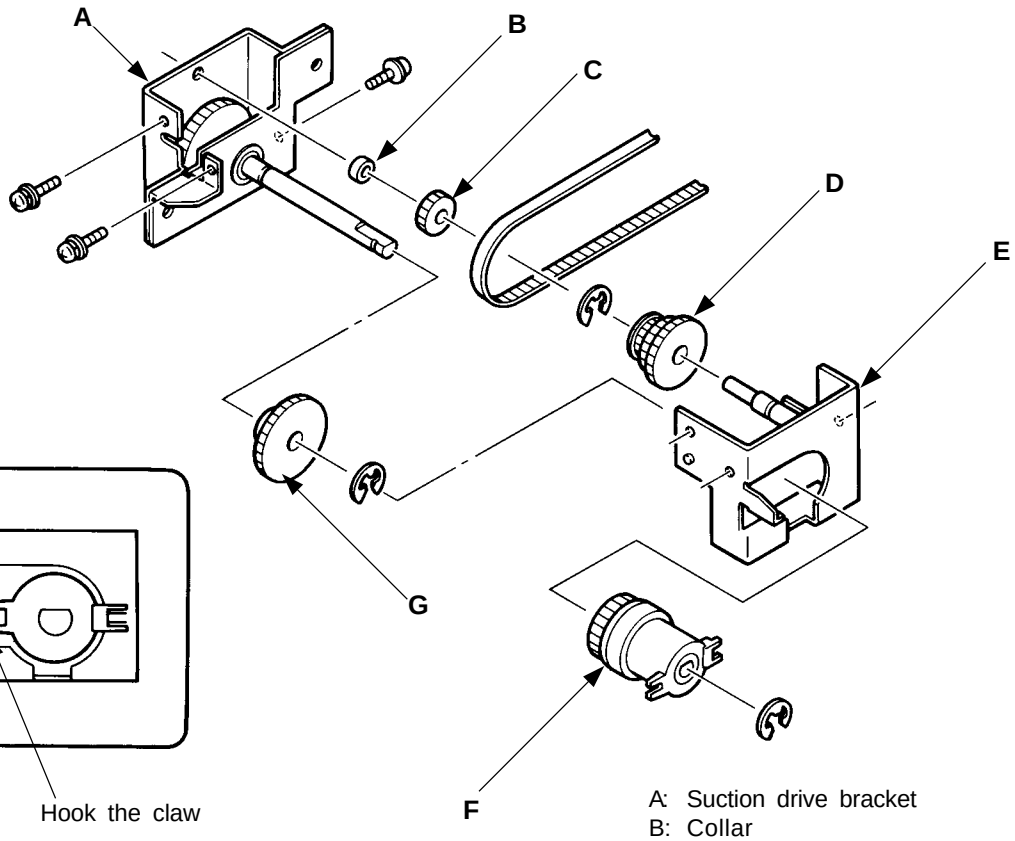
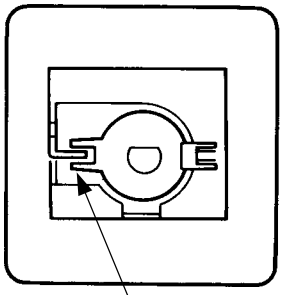


Fig. a

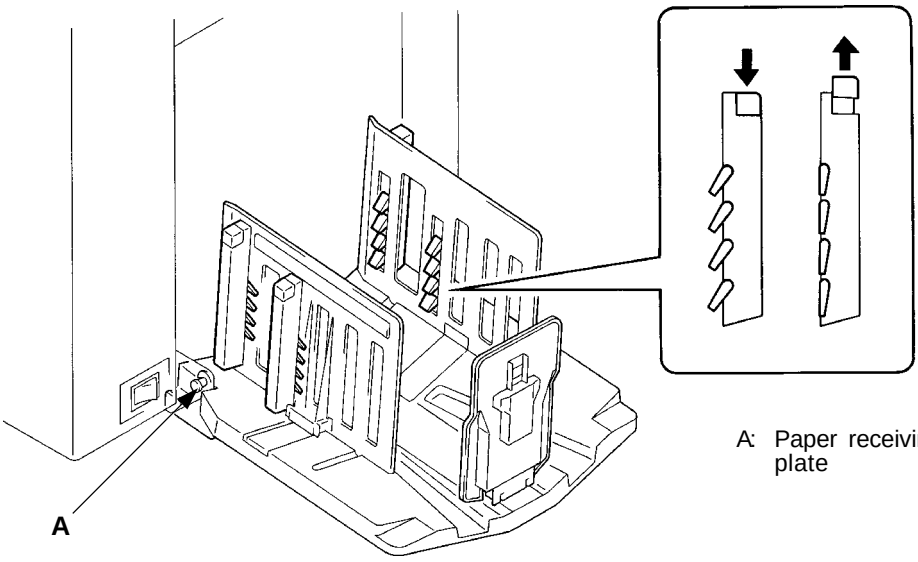


A: Suction drive bracket
B: Collar
C: Idler gear
D: Speed change gear
E: Clutch cover assembly
F: Suction clutch
G: Low-speed gear (One-way Clutch)

5. Paper Receiving Tray

< Removal Procedure >

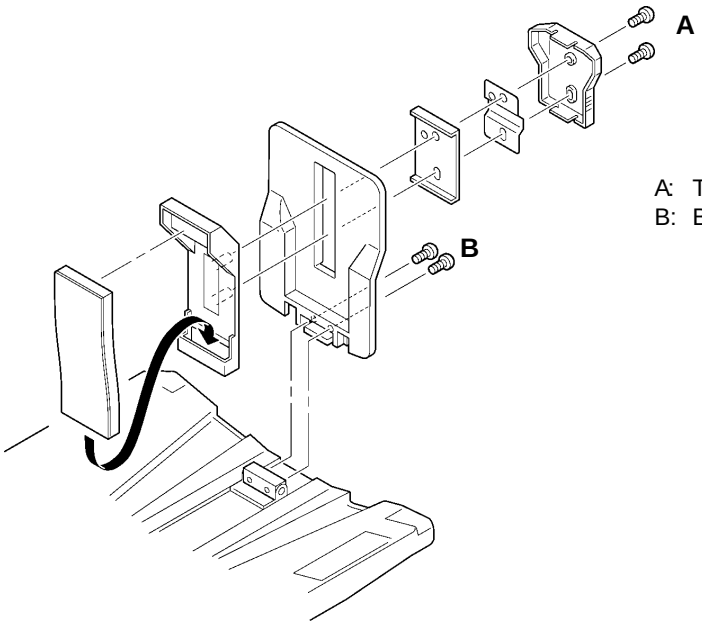
1. Remove two mounting screws of the Paper receiving tray lock plates on the left and right of the Paper receiving tray and remove the lock plates.
2. Remove the Paper receiving tray.



A: Paper receiving tray lock plate

Disassembly of Paper Back Stop

For disassembly and reassembly of the Paper back stop, see the figure below.



A: Tapping screws
B: Bind-head screw M3x6

LED RCV1 Paper receiving sensor 1
– Light up when light path is blocked
RCV2 Paper receiving sensor 2
– Light up when light path is blocked
Test Mode No.19 Paper receiving sensor 1
– Short interval beeps when light path is blocked
No.20 Paper receiving sensor 2
– Short interval beeps when light path is blocked
No.62 Main motor rotation variable speed

6. Suction Unit

< Removal Procedure >

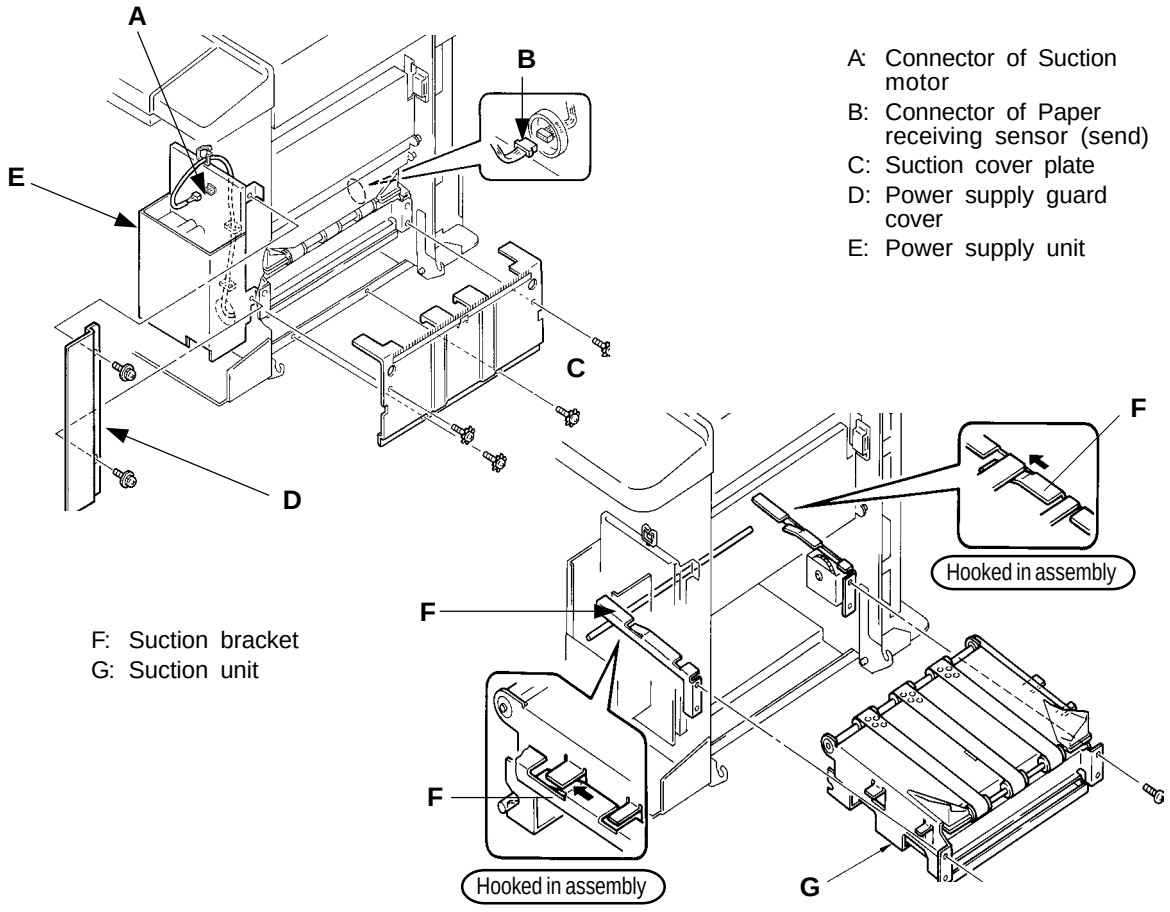
1. Turn OFF the power, and remove the Paper receiving tray and Front right cover.
2. Remove four mounting screws on the Suction cover plate, and remove the plate.
3. Remove two mounting screws on the Power supply guard cover, and remove the cover.
4. Unscrew and remove the Ground wire of the Suction motor from the Power supply unit and disconnect the connector **CN3M** from the Power supply unit.
   Pull the wire harness of the Suction motor towards the Suction unit.
   [Note]
   The wire harness is clamped onto the Power supply unit at the back of the unit.
5. Disconnect the Connector of the Paper receiving sensor (send).
   Remove two mounting screws on the Suction unit and remove the unit from the machine.

- Precautions in Assembly -

- When installing the Suction unit into the machine, make sure to position it correctly and secure it firmly against the hooks on the railings.
  If not hooked firnly onto the railings, the unit may be raised out of position and hit against the Separator, causing the Transfer belts on the Suction unit torn or the Separator broken.

- Checking after Mounting

- Check engagement of the gears between the Suction unit and the machine by rotating the Drum with Test mode **No.62**, after assembly. Reposition the Suction unit if a loud howling noise is heard.
- Check whether the light path of the Paper receiving sensors 1 and 2 are aligned.



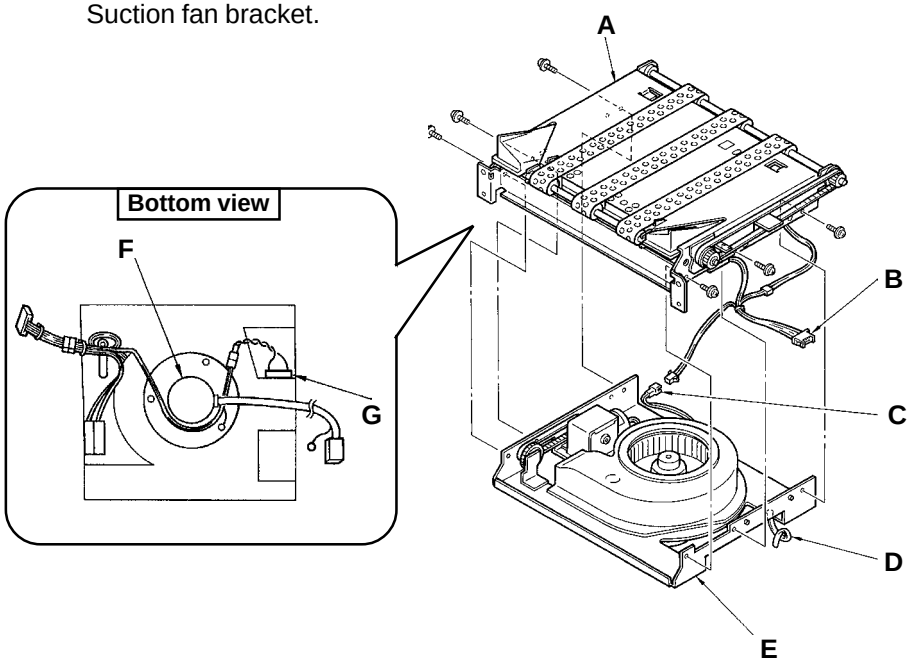
A: Connector of Suction motor
B: Connector of Paper receiving sensor (send)
C: Suction cover plate
D: Power supply guard cover
E: Power supply unit

F: Suction bracket
G: Suction unit

7. Transfer Belt

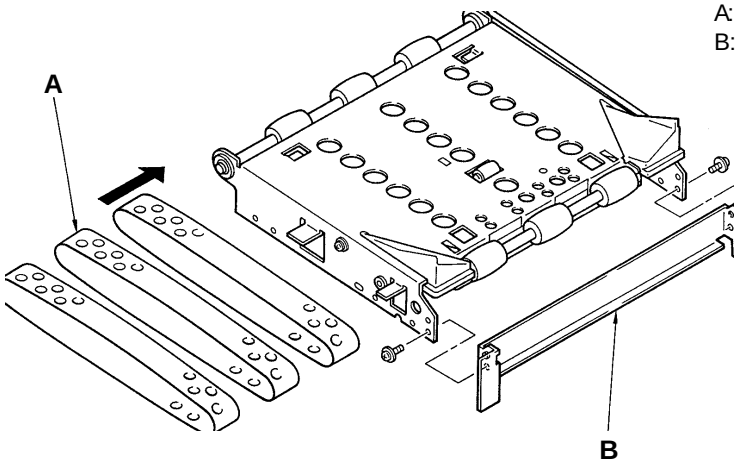
< Removal Procedure >

1. Remove the Suction unit from the machine, referring to the page 7R-6.
2. Remove six mounting screws on the Suction face cover unit.
3. Disconnect the connector of the Wing motor and separate the Suction face cover unit from the Suction fan bracket.



A: Suction face cover unit
B: Connector to the machine
C: Connector of the Wing motor
D: Wire clamper
E: Suction fan bracket
F: Suction fan ass'y
G: Wing motor

4. Remove two mounting screws on the Suction stay, and remove the stay.
5. Remove the Transfer belts from the Suction face cover.



A: Transfer belt
B: Suction stay

- Precautions in Assembly -

- The positioning bosses on the Suction stay should be matched with the holes on the Suction face cover.
- The wire harness of the Wing motor should be led around the Suction fan ass'y .
- The positioning bosses on the Suction fan bracket should be matched with the holes on the Suction face cover unit.

Test Mode No.26 Jump wing SW1
– Short interval beeps when pressed
No.27 Jump wing SW2
– Short interval beeps when pressed
No.80 Wing motor

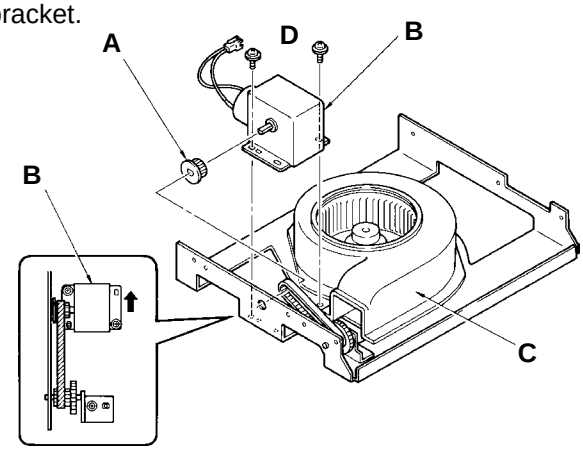
8. Wing Motor

< Removal Procedure >

1. Remove the Suction unit from the machine, referring to the page 7R-6.
2. Separate the Suction face cover unit from the Suction fan bracket, referring to the page 7R-7.
3. Remove two mounting screws on the Wing motor bracket, and remove the motor.

- Precautions in Assembly -

- Be careful not to attach the Wing motor pulley in the opposite direction.
- Secure the Wing motor, pulling it to apply tension to the belt.
- The positioning bosses on the Suction fan bracket should be matched with the holes on the Wing motor bracket.



A: Motor pulley
B: Wing motor
C: Suction fan
D: Pan-head IT Screw M3x5

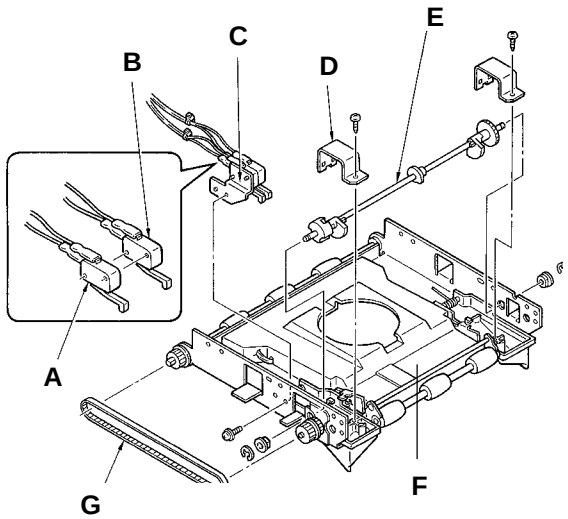
9. Jump Wing Sw, Wing Cam Shaft

< Removal Procedure >

1. Remove the Suction unit from the machine.
2. Separate the Suction face cover unit from the Suction fan bracket.
3. Remove the mounting screw of the Wing switch bracket, and remove the bracket together with the Jump wing switches.
4. Remove wires from the terminals of the Jump wing switches.
5. Remove the E-rings on both sides of the Wing cam shaft and bearing metals to remove the shaft.

- Precautions in Assembly -

- Check after assembly that the Jump wing switches are actuated ON and OFF by manually rotating the Wing cam shaft.



A: Jump wing SW 1
B: Jump wing SW 2
C: Wing switch bracket
D: Jump wing plate
E: Wing cam shaft
F: Suction face cover unit
G: Transfer drive belt

LED RCV1 Paper receiving sensor 1
– Light up when light path is blocked
RCV2 Paper receiving sensor 2
– Light up when light path is blocked
Test Mode No.19 Paper receiving sensor 1
– Short interval beeps when light path is blocked
No.20 Paper receiving sensor 2
– Short interval beeps when light path is blocked

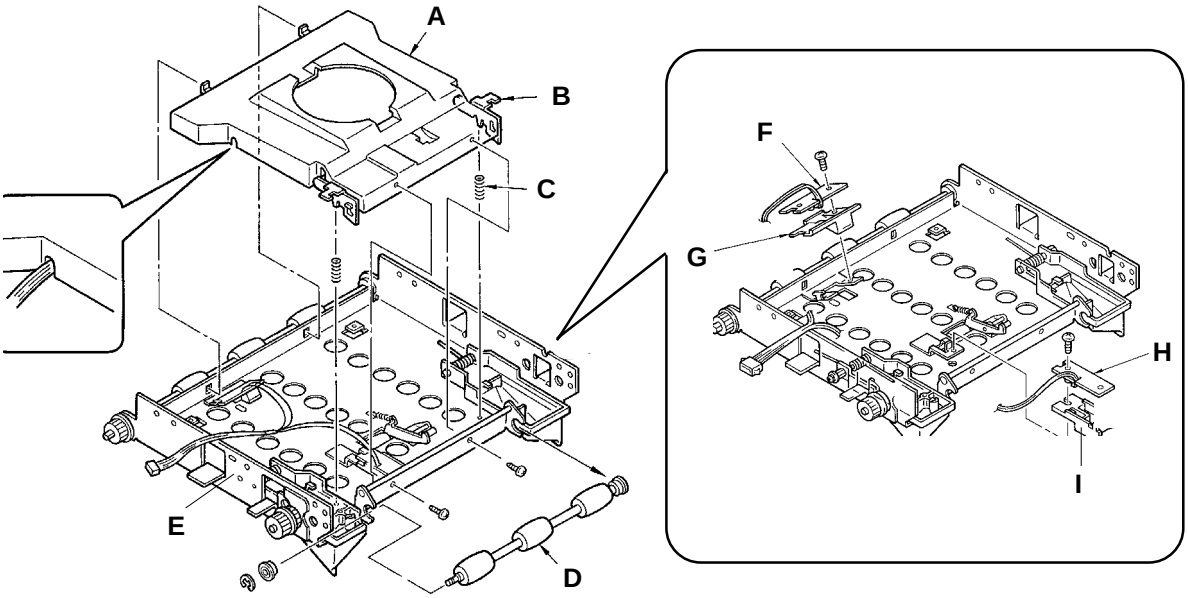
10. Paper Receiving Sensors (Send)

< Removal Procedure >

1. Remove the Suction unit from the machine.
2. Separate the Suction face cover unit from the Suction fan bracket and remove the Transfer belts.
3. Remove the Wing cam shaft and Wing switch bracket.
4. Remove an E ring and a metal bearing at one end of the Suction idler shaft and remove the shaft from the hooks of the Suction face cover.
5. Remove two mounting screws of the Upper suction cover, and remove the cover.
   [IMPORTANT]
   Be careful not to lose the springs attached onto the Side flaps on both sides of the Upper suction cover.
6. Remove the mounting screws on the Paper receiving sensors 1 and 2, and remove the sensors.

- Precautions in Assembly -

- The Wire harness of the Paper receiving sensors should be led through the opening on the Upper suction cover.
- Insert the hooks of the Upper suction cover into the holes of the Suction face cover.

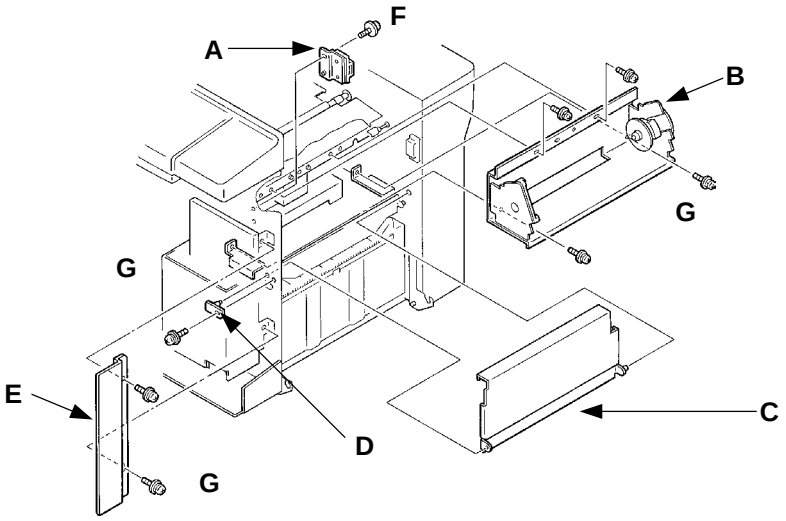


A: Upper suction cover
B: Side flap
C: Side flap spring
D: Suction idler shaft
E: Suction face cover
F: Paper receiving sensor 1
G: Paper rcv. sensor cover 1
H: Paper receiving sensor 2
I: Paper rcv. sensor cover 2

11. Separation Fan and Stocker Unit (A3 MACHINE)

< Removal Procedure >

1. Disconnect the Power cord and remove the Front right cover.
2. Remove two mounting screws on the Power supply right cover, and remove it.
3. Remove the mounting screw on the Master holder cover set plate, and remove the plate. Pull down the Master roll holder cover and remove it.
4. Remove two mounting screws on the Magnet catch assembly, and remove it.
5. Remove four mounting screws on the Master roll holder unit, and remove the unit.



A: Magnet catch assembly
B: Master roll holder unit
C: Master roll holder cover
D: Master holder cover set plate
E: Power supply right cover
F: Bind-head Screw M4x6
G: Pan-head Screw Sw. W M4x6

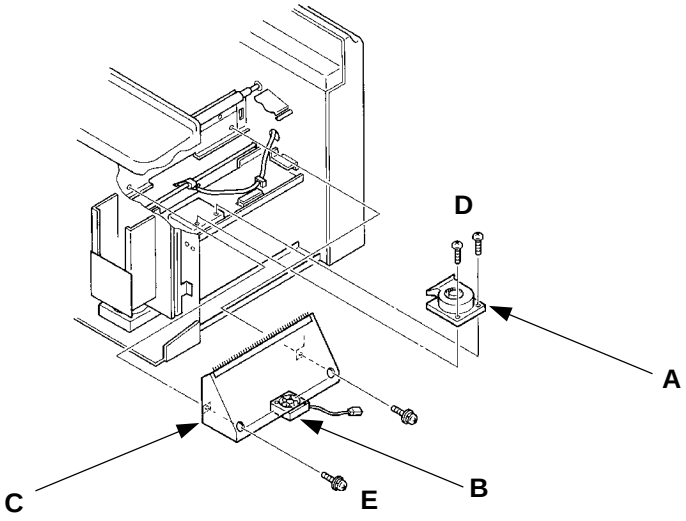
6. Disconnect the Connector of the Separation fan.
7. Remove two mounting screws of the Separation fan and remove the fan.

- Precautions in Assembly -

- The Separation fan has two connectors, but one of them is unused(purple, grey).

- Stocker Unit

6. Disconnect the connector of the loading fan, remove two mounting screws of the Stocker unit and remove the unit with Loading fan attached.



A: Separation Fan Assembly
B: Loading Fan
C: Stocker Unit
D: Bind-head Screw M4x6
E: Pan-head Screw SW.W M4x8

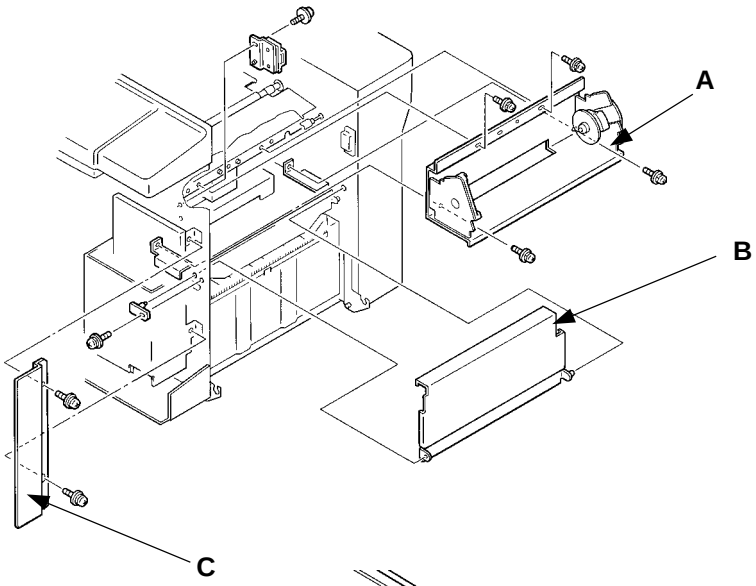
12. Separation Fan (B4/A4 MACHINE)

< Removal Procedure >

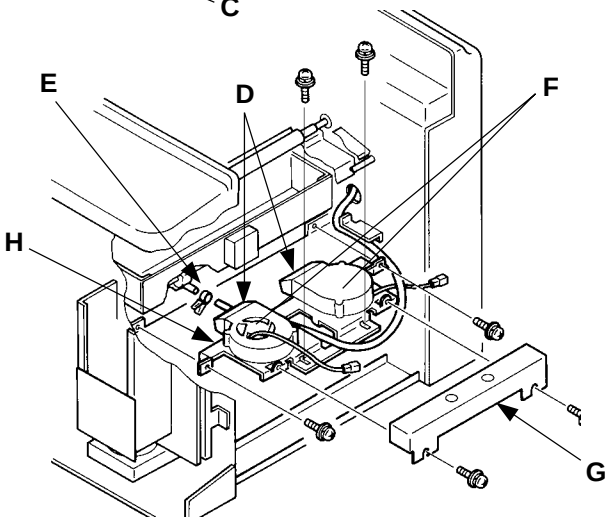
1. Remove the Drum from the machine, disconnect the Power cord, and remove the Front right cover.
2. Remove two mounting screws of the Power supply right cover, and remove it.
3. Remove the mounting screw on the Master holder cover set plate, and remove the plate. Pull down the Master roll holder cover and remove it.
4. Remove four mounting screws of the Master roll holder unit, and remove the unit.
5. Remove two mounting screws on the Set guide plate.
6. Disconnect the connector of the sensor and take out the Set guide plate from the machine.
7. Remove two mounting screws on the Separation fan cover, and remove the cover.
8. Disconnect the connector of the Separation fan.
9. Release the Separation air pump from the clamper, remove four mounting screws of the Separation fan bracket and take out the bracket with the separation fans attached.

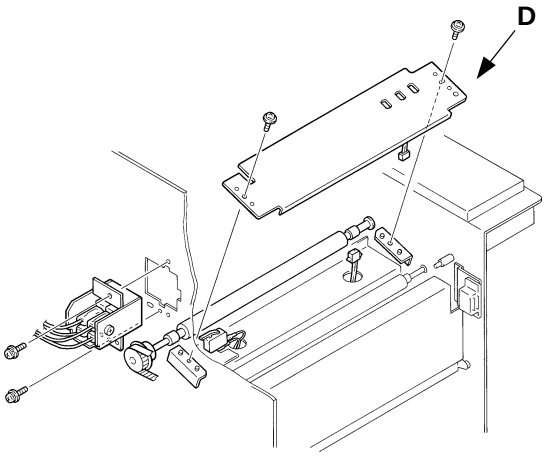
- Precautions in Assembly -

- The positioning bosses on the upper stay shoud be matched with the holes on the Master roll holder unit.



A: Master roll holder unit
B: Master roll holder cover
C: Power supply right cover
D: Set guide plate
E: Clamper
F: Separation fan
G: Separation fan cover
H: Separation fan bracket





LED RCV1 Paper receiving sensor 1
– Light up when light path is blocked
LED RCV2 Paper receiving sensor 2
– Light up when light path is blocked
Test Mode No.19 Paper receiving sensor 1
– Short interval beeps when light path is blocked
No.20 Paper receiving sensor 2
– Short interval beeps when light path is blocked

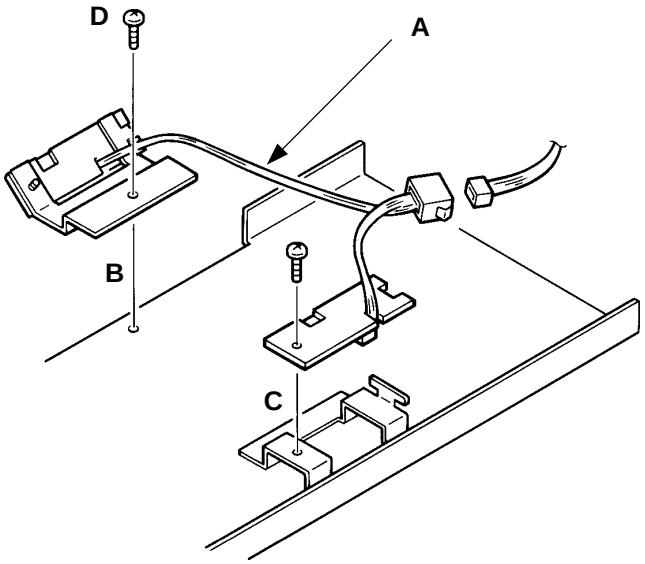
13. Paper Receiving Sensors (Receive)

< Removal Procedure >

1. Disconnect the power cord and remove the following parts:
   - Front right cover
   - Power supply right cover, Master holder cover set plate, Master roll holder cover, Master roll holder unit.
   - Separation fan assembly (Stocker unit for the A3 machine only)
2. Disconnect the connector of the Paper receiving sensors (receive).
3. Remove the mounting screw on the Paper receiving sensor bracket, and remove the bracket with the Paper receiving sensor 1 attached, from the bottom of the middle stay.
4. Remove the securing screw on the Paper receiving sensor 2.

- Checking after Assembly -

- Check whether the light path of the Paper receiving sensors 1 and 2 are aligned.



A: Paper receiving sensors(receive)
B: Paper receiving sensor 1
C: Paper receiving sensor 2
D: Bind-head Screw M3x6

ADJUSTMENT

1. Position of Separator

1. Remove the Back cover.
2. Rotate the Drum by pressing **SW1** on the **System PCB** until the tip of the Separator is positioned close to the surface of the Drum, if necessay.
   Turn OFF the power.
3. Check if the tip of the Separator is **1.0 ~ 2.0 mm** off the Drum.
4. If not, loosen the securing screws of the Separator adjustment plate on the plate itself and on the side frame of the machine to adjust the position of the Separator.
   Move up or down the Separator adjustment plate by moving the securing screw on the side frame to place the Separator at the position where its tip is **1.0 ~ 2.0 mm** off the Drum.
5. Tighten the securing screws of the adjustment plate and turn ON the power.
6. Check by rotating the Drum with a press of SW1 on the System PCB that the Separator does not get in contact with the surface of the Drum at any other positions.
7. If it does, re-adjust the position of the Separator by repeating the procedures in the steps 2 to 4 above.

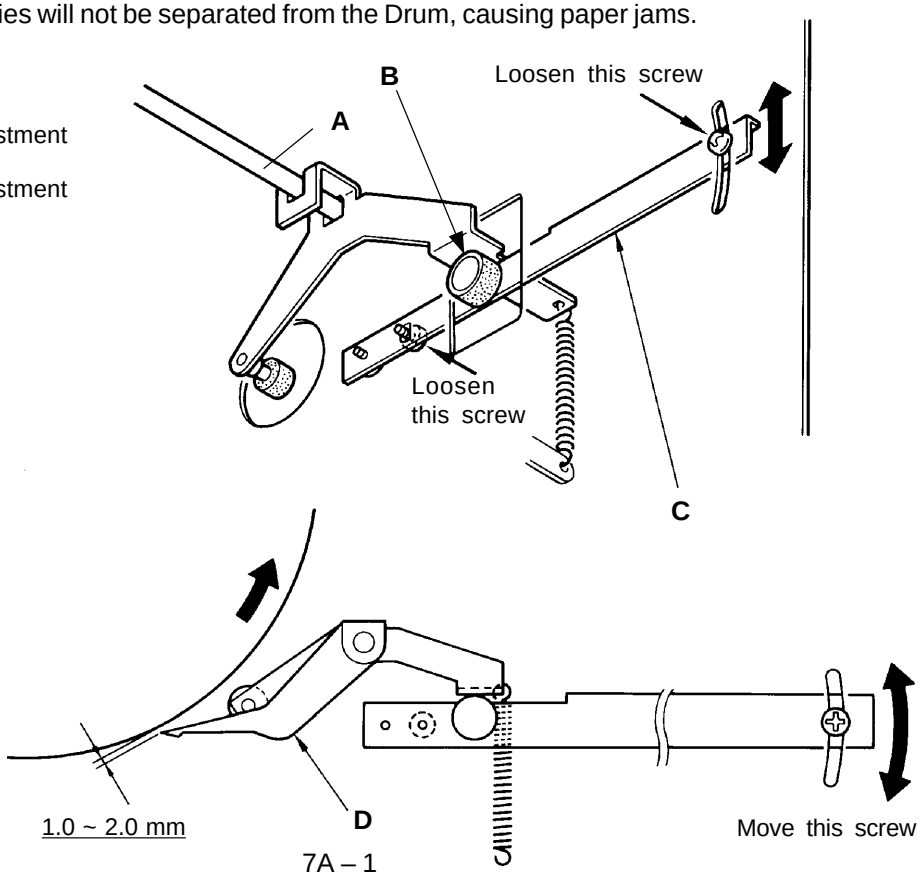
- Precautions in Adjustment -

- Check that a printed sheet is separated from the Drum if it has at least a **10mm**-margin at the top after adjustment.

- Results of Misadjustment -

- If the tip of the Separator is in contact with the Drum;
  it will scratch the surface of the master on the Drum, creating black lines in the middle of printed copies or will damage the screens.
- If the tip of the Separator is placed far off the Drum;
  printed copies will not be separated from the Drum, causing paper jams.

A: Separator shaft
B: Separator adjustment collar
C: Separator adjustment plate
D: Separator



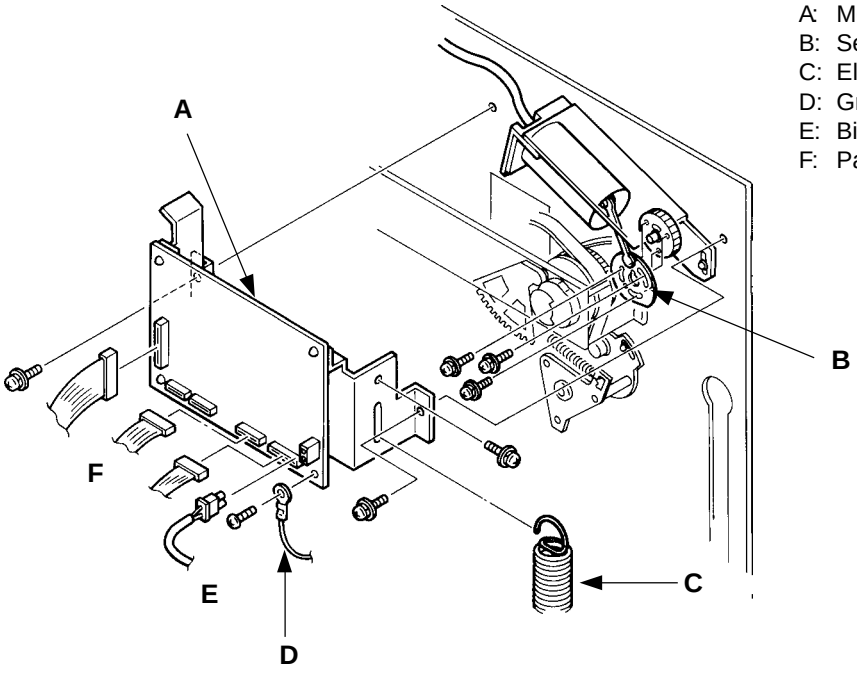
2. Position of Separation Pump Pulley Plate (Timing Adjustment of Separator Air Blow)

- Checking and Method

1. Move up the Paper feed tray, set the Drum to the position A, turn OFF the power, and remove the Back cover.
2. Remove the Elevator spring from the Motor control PCB bracket.
3. Disconnect the connector from the Motor control PCB. Remove three mounting screws of the Motor control PCB bracket and remove the bracket with the Motor control PCB attached.
4. Check that the alignment holes of the Separation pump pulley plate and Separation air pump bracket are aligned with each other.(See Fig. a)
5. If they are misaligned, loosen three securing screws on the Separation pump pully plate, and adjust the position.

- Phenomenon -

- If the mounting position of the Separation pump pulley plate is dislocated, an air blow timing may go out of tune, causing paper jams.



A: Motor control PCB
B: Separation pump pulley plate
C: Elevator spring
D: Ground wire
E: Bind-head screw M3x6
F: Pan-head screw SW. W M4x6

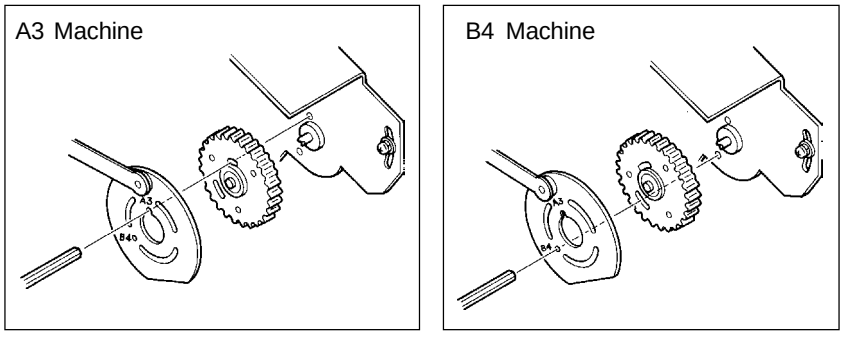


Fig. a

Since the paper feed timing of A3 machine is faster than other machine, it is necessary to quicken the air blow timing.

CHAPTER 8: DRUM SECTION

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LED DRMA Position A sensor
– Light up when light path is blocked
DRMC Position C sensor
– Light up when light path is blocked
Test Mode No.8 Position A sensor
– Short interval beeps when light path is blocked
No.11 Position C sensor
– Short interval beeps when light path is blocked

THEORY OF OPERATION

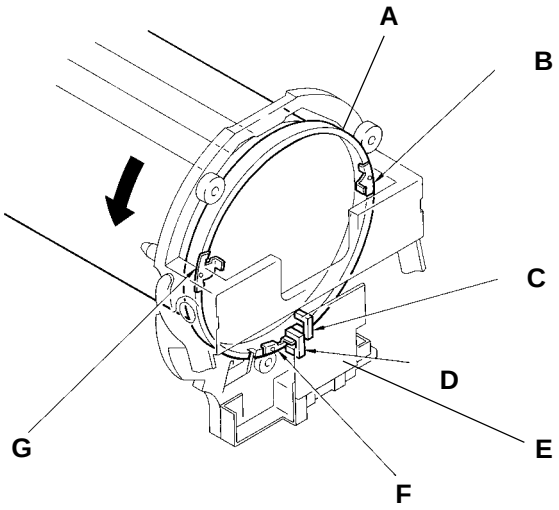
1. Drum Rotation Check System

A drum rotating position is checked with the Position A sensor, Position C sensor, and Pressure detection sensor or Encoder sensor on the Main motor.

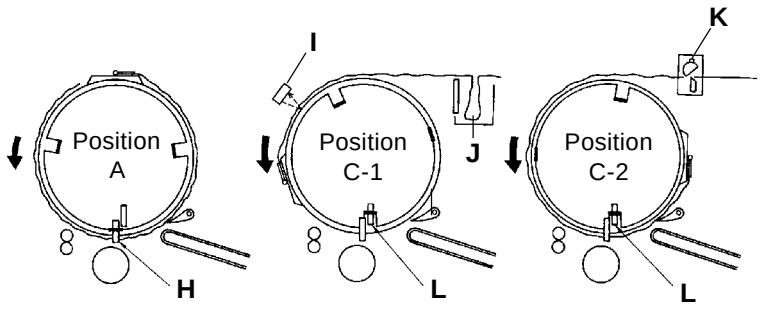
(1) Position A
This is the basic position(home position) in a cycle of the Drum, where the light path of the Position A sensor is blocked by the Plate A.
Example:
The Clamp solenoid is activated to open the clamp plate in master removal and close it in master loading.

(2) Position C-1
This is the position where the light path of the Position C sensor is blocked by Plate C-1 and the Drum is a little more than a quarter of a turn off the Positon A.
Example:
The Master loading sensor checks if a master is correctly loaded on the Drum in master loading.

(3) Position C-2
This is the position where the light path of the Position C sensor is blocked by Plate C-2 and the drum is about three-quarters of a turn off the Position A.
Example:
The Cutter motor is activated to cut a master after master loading.



A: Drum Body Support (Right)
B: Plate C-2
C: Position C Sensor (Interrupt Type)
D: Position A Sensor (Interrupt Type)
E: Drum control PCB
F: Plate A
G: Plate C-1
H: Position A Sensor
I: Master Loading Sensor
J: Stocker
K: Cutter
L: Position C Sensor



T1 (Main Motor Lock)
• Position A sensor kept turned on • Position A sensor not turned on

T16 (Position C Sensor Malfunction)
• Position C sensor not turned on/off

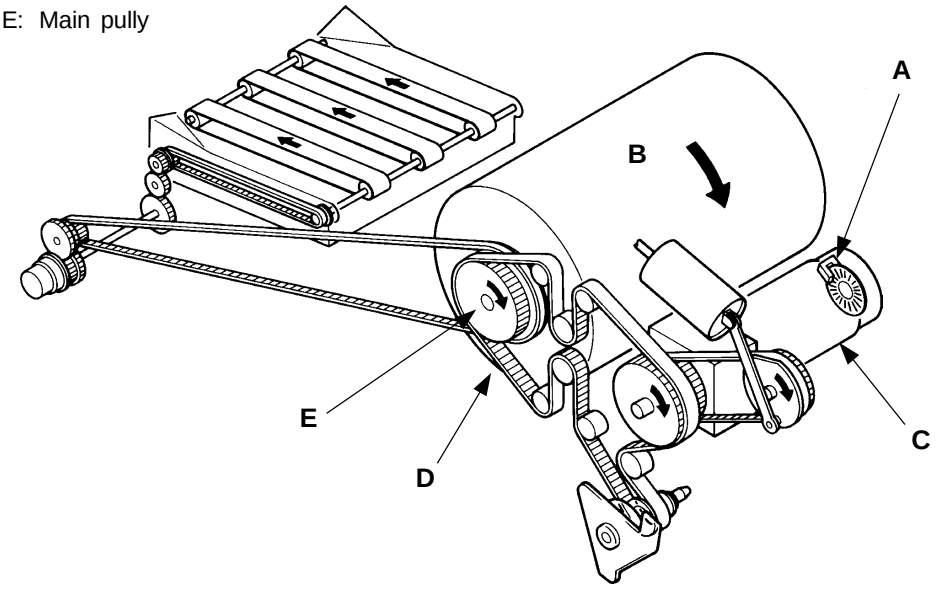
(4) Encoder Sensor
The position of the Drum is determined by the count signal from the Encoder sensor.

4-1 Drum Angle 1
This position is when the Drum rotates 32° from the 0° position (Postion A).
Example:
The Paper feed clutch is activated to feed a paper.

4-2 Drum Angle 2
This position is when the Drum rotates 160° from the 0° position (Position A).
Example:
The Pressure solenoid is deactivated in printing.

4-3 Drum Angle 3
This position is when the Drum rotates 255° from the 0° position (Position A).
Example:
The Paper receiving sensor 1 checks for detection of paper jams.

A: Main motor encoder sensor
B: Drum
C: Main moter
D: Main belt
E: Main pully



LED PRSS Pressure det. sensor
– Light up when light path is blocked
Test Mode No.7 Pressure det. sensor
– Short interval beeps when light path is blocked

(5) Pressure detection sensor

The position of the Drum is determined by the signal from the Pressure detection sensor.

5-1 Pressure detection sensor - 1 position

This is the position where the light path of the Pressure detection has just been opened and the Drum is a little less than a half of a turn off the Positon A.

Example:

The Pressure solenoid is deactivated in printing.

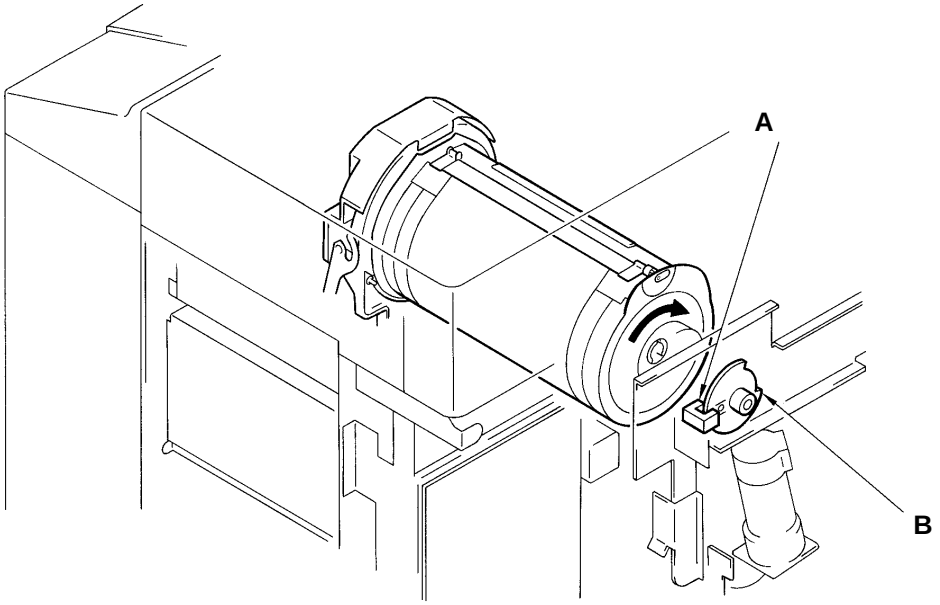
5-2 Pressure detection sensor - 2 position

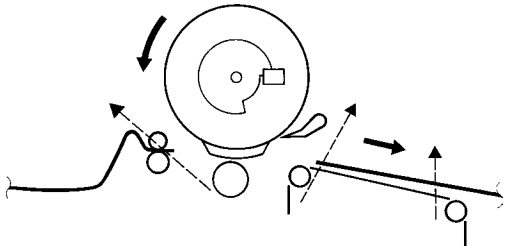
This is the position where the light path of the Pressure detection has just been blocked and the Drum is a little less three-quarters of turn off the Position A.

Example:

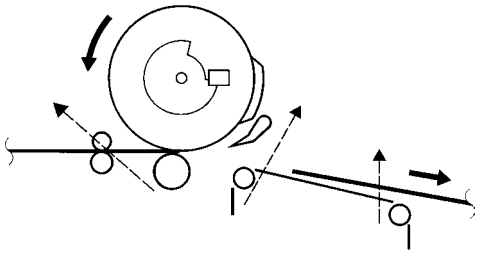
The paper receiving sensor 1 checks for the detection of paper jams.

A: Pressure detection sensor
B: Pressure sensor disc





Pressure Detection Sensor-1 Position
(Viewed from Panel Side)



Pressure Detection Sensor-2 Position
(Viewed from Panel Side)

T6 (Pressure Detection Sensor Malfunction)
• Pressure detection sensor not turned on/off

2. Drum Locking System

- Check of Drum Installation

When the Drum handle is let down after installing the Drum in the machine, the actuator of the Drum set switch is pressed by the handle, to indicate that the Drum is set in position.

- Lock of Drum in Machine

The Drum is supported by the Drum holder which is mounted on the Drum rails.
When the Drum is in the machine, the bent part of the Drum rail bracket, which is attached under the center Drum rail, is caught by the Drum lock hook to prevent the Drum from being released out of the machine while the Drum is rotating.

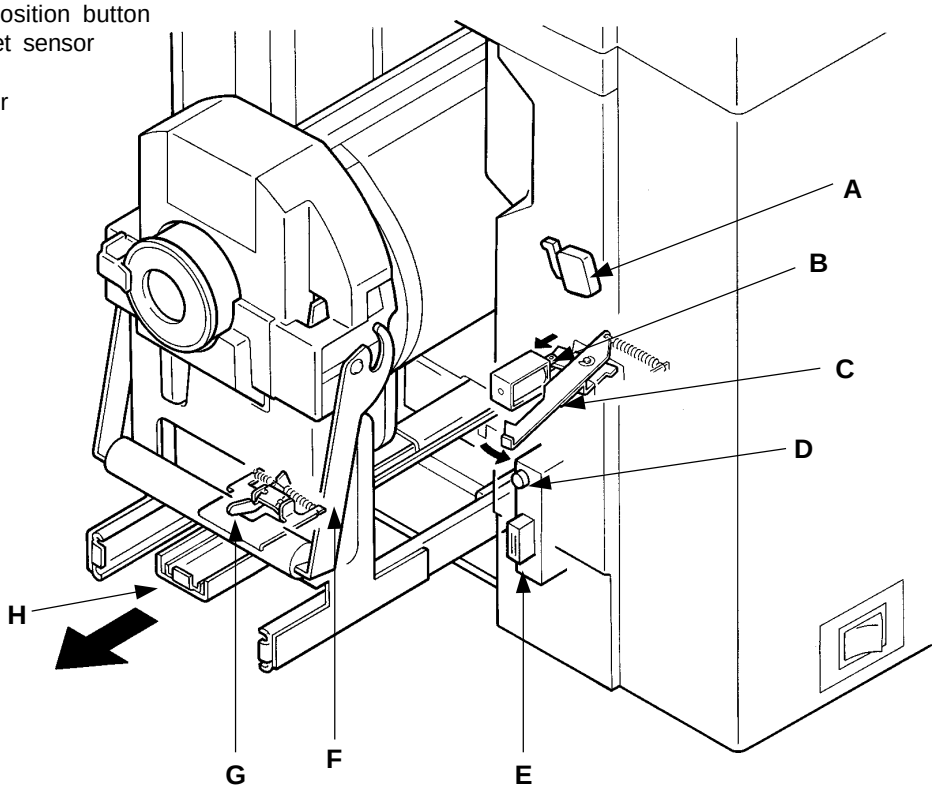
- Lock Release

When the Drum is at the home position, and the Front cover is opened, the Lock solenoid is activated ON to pull aside the Drum lock hook off the bent part of the Drum rail bracket, which allows the Drum to be released from the machine.

- Drum Set Lever

When the Drum is not existing, the Drum set lever prevents the Drum rail from entering the main body.

A: Drum set SW
B: Lock solenoid
C: Drum lock hook
D: Drum home position button
E: Front cover set sensor
F: Drum handle
G: Drum set lever
H: Drum rail



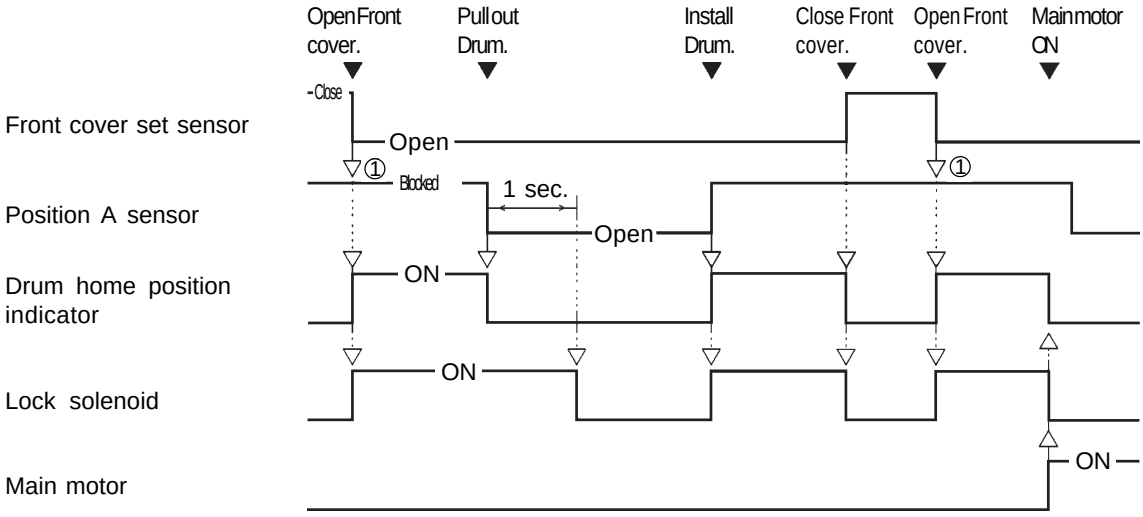
* If the Drum set switch is not pressed, “SET DRUM IN PLACE” will be displayed.

THEORY OF OPERATION

Test Mode No.30 Front cover set SW
– Short interval beeps when cover is closed
No.16 Drum home position button
– Short interval beeps when pressed
No.18 Drum set SW
– Short interval beeps when pressed
No.74 Lock solenoid

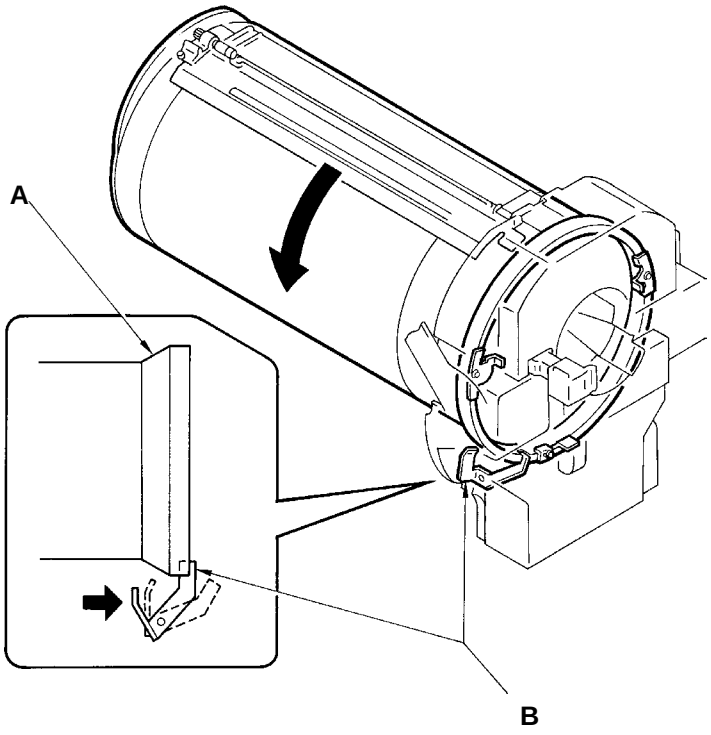
- Timing Chart -

Drum Locking System < In normal operation >



① The machine checks if the light path of the Position A sensor is blocked (if the Drum is at the home position).

When you want to manually rotate the Drum, push the Position A lock plate with hand to release the Lock plate from the Drum body support(right) and be sure to move it in the arrow-indicated direction.(If rotated in the reverse direction, the Ink blocking plate will be deformed)



A: Drum body support (right)
B: Position A lock plate

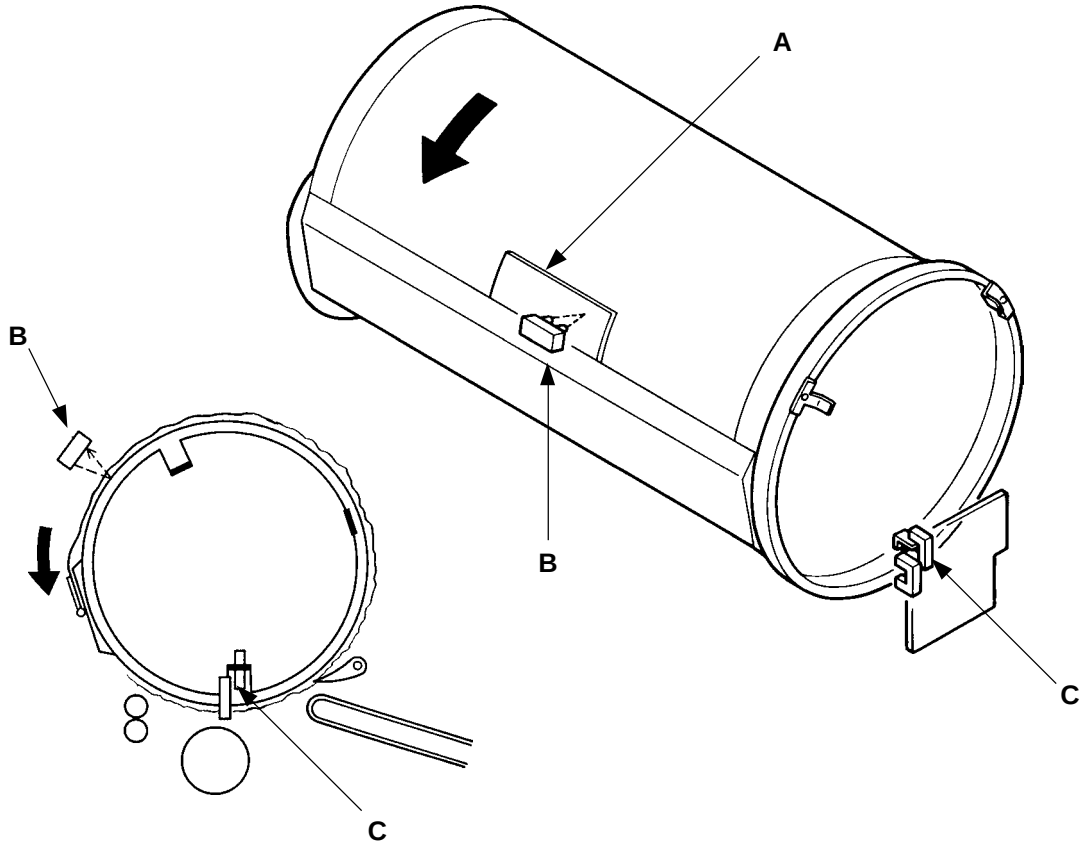
LED DRMC Position C sensor
– Light up when light path is bloced
CSEN Master loading sensor
– Light up when reflected light detected
Test Mode No.11 Position-C sensor
– Short interval beeps when light path is blocked
No.48 Master loading sensor
– Short interval beeps when reflected light detected

3. Master Presence Check System

- Master loading sensor

Master loading sensor checks the presence of the master on the Drum at the Position C-1.
If the machine already knows the presence of the master on the Drum from the earlier machine operation, this master check movement is skipped.
The information (Master existence) checked with the Master loading sensor remains in the memory until the Drum is pulled out.

A: Light absorber strip
B: Master loading sensor (Reflection Type)
C: Position C sensor (Interrupt Type)



* If the master is not on the drum upon starting printing, “NO MASTER ON DRUM. PRESS ALL RESET KEY AND MAKE A NEW MASTER” will be displayed.

4. Drum Type, Ink Bottle Detecting System

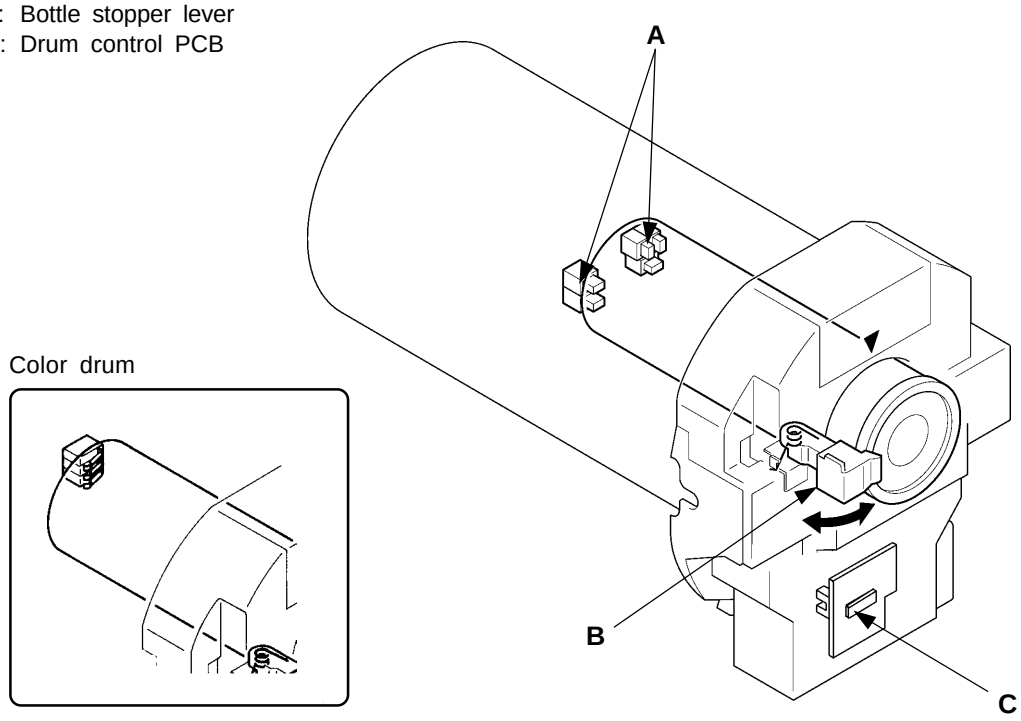
- Ink Bottle detecting

Ink bottle set SW checks the presence of the Ink bottle and type of Ink bottle.
There are five switches on the PCB for the Black drum and three switches for the Color drum as shown on the below figure.
Ink bottle set SW checks whether the correct ink is set in the Drum or not.

- Drum Type detecting

The Drum type and size are recognized by the setting of the Dip SW on the Drum control PCB.

A: Ink bottle set SW
B: Bottle stopper lever
C: Drum control PCB



Color drum

* If a wrong drum is set, “WRONG TYPE DRUM INSTALLED” will be displayed.
* If a different size of drum is set, “WRONG SIZE DRUM INSTALLED” will be displayed.
* If the Ink bottle set switch is not pressed, “INSTALL INK CARTRIDGE” will be displayed.
* If a wrong combination of the Ink bottle set switch is pressed, “WRONG TYPE INK CARTRIDGE INSTALLED” will be displayed.

LED INK Ink sensor
– Light up when ink is not detected
FLOW Overflow sensor
– Light up when ink is not detected

5. Ink Supply System

- Rotation of Ink Driving Shaft and Squeegee Roller

When the Main shaft catch is rotated by the Main shaft, it rotates the Squeegee belt, which rotates the Ink driving shaft via the Ink driving shaft axis and the Squeegee roller via the Squeegee pulley.

[Note]

The Squeegee roller rotates clockwise while the Ink driving shaft rotates counter-clockwise.

- Ink Supply to the Inner Surface of Drum

When the Squeegee roller is rotated, ink is pressed through a narrow space above the roller and spread on it by the Doctor roller, which is attached close and in parallel to the Squeegee roller. The ink on the Squeegee roller is then transferred to the inner surface of the Drum.

The ink which does not pass through the narrow space and remains there forms a long and even bead, rolled by the rotating Ink driving shaft.

- Ink Supply from Ink Bottle

When ink is used in printing, the ink bead becomes thinner and exposes the tip of the Ink sensor attached to the Drum PCB, which activates the Inking motor, driving the piston in the Inking pump. This operation pumps ink out of an ink bottle through the nozzle of the Inking pump and supplys ink into the Squeegee section through the holes of the Ink distributor.

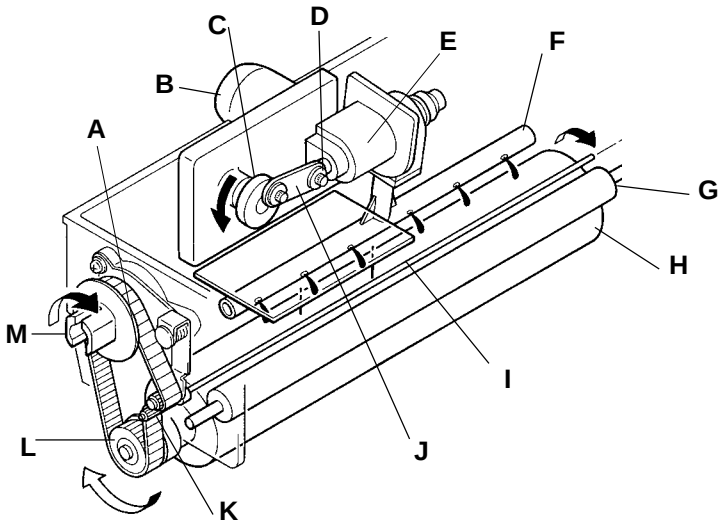
- Detection of Ink Volume

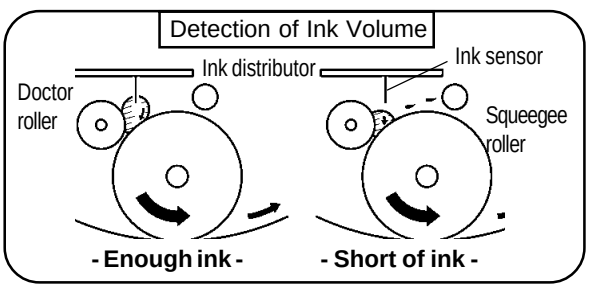
When the ink bead gets thicker due to ink supply, it gets contact with the Ink sensor, which deactivates the Inking motor to stop ink supply.

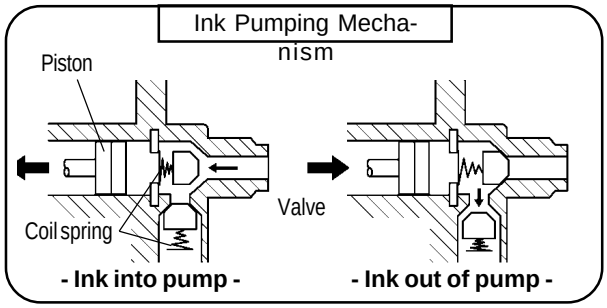
- Detection of Ink Overflow

If the ink bead gets so thick as to get contact with the Overflow sensor, which is a shorter pin than the Ink sensor and attached to the Drum PCB, the Inking motor is deactivated to prevent ink from overflowing the Squeegee section if it is operating and the error code **[T4]** is displayed on the operation panel.

A: Squeegee belt
B: Inking motor
C: Linking disc
D: Piston
E: Ink pump unit
F: Ink distributor
G: Doctor roller
H: Squeegee roller
I: Ink driving shaft
J: Linking plate
K: Ink driving shaft axis
L: Squeegee pulley
M: Main shaft catch



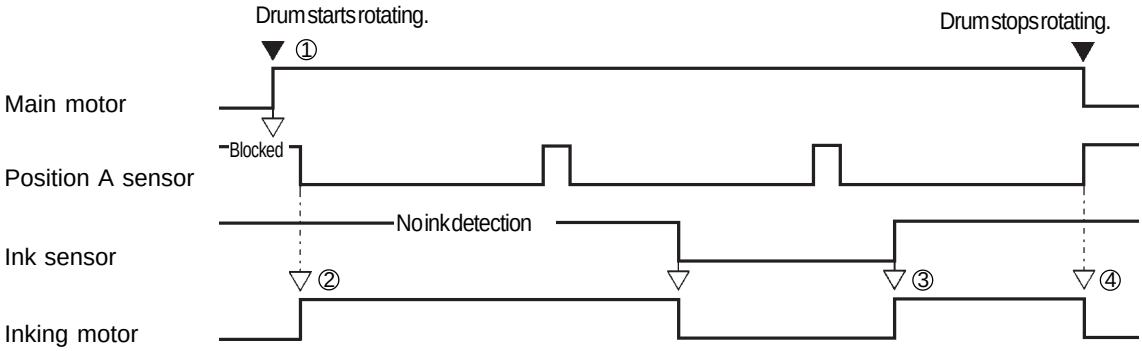




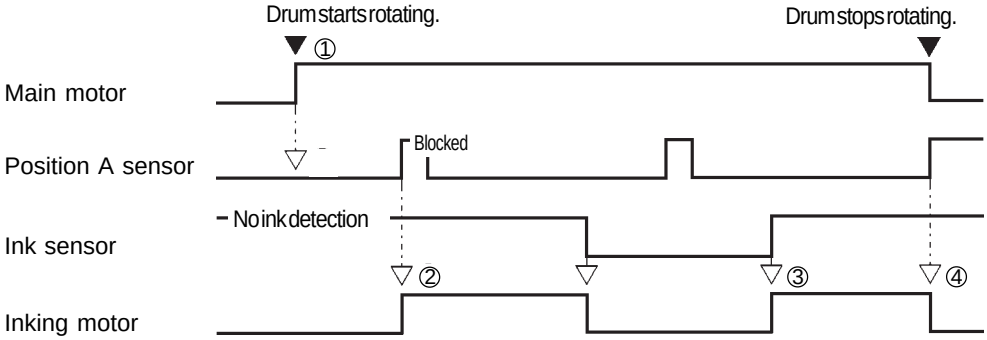
Test Mode No.37 Ink sensor
– Short interval beeps when ink is detected
No.38 Overlow sensor
– Short interval beeps when ink is detected

- Timing Chart -

Ink Supply System < when the Drum starts rotating from the Position A >



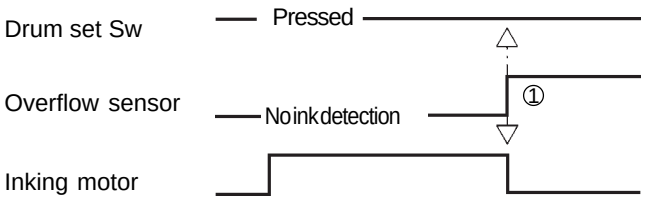
Ink Supply System < when the Drum starts rotating from any position but the Position A >



① If the Ink sensor is not in contact with ink when the Main motor starts operating, the Inking motor is not activated.
② As soon as the light path of the Position A sensor is opened or blocked (it is confirmed that the Drum is rotating), the Inking motor is activated.
③ If the Ink sensor gets out of contact with ink while the Main motor is operating, the Inking motor is activated.
④ When the Main motor stops operating, the Inking motor is deactivated.

* If the Ink sensor hasn't got contact with ink **within 30 seconds** after the Inking motor is activated, the machine assumes that no ink remains inside an ink bottle and the advice display **[REPLACE INK CARTRIDGE]** blinks on the operation panel.
When the Main motor stops operating before the built-in timer counts up 30 seconds to detect emptiness of an ink bottle, the timer is held.

Ink Overflow Detection Process



① If the Overflow sensor gets in contact with ink, the machine assumes that ink is about to overflow the Squeegee section and deactivates the Inking motor if it is in operation. In this case, the error code **[T4]** is displayed on the operation panel.

T4 (Overflow)
• Overflow Sensor ON

MEMO

REMOVAL & ASSEMBLY

1. Lock Solenoid

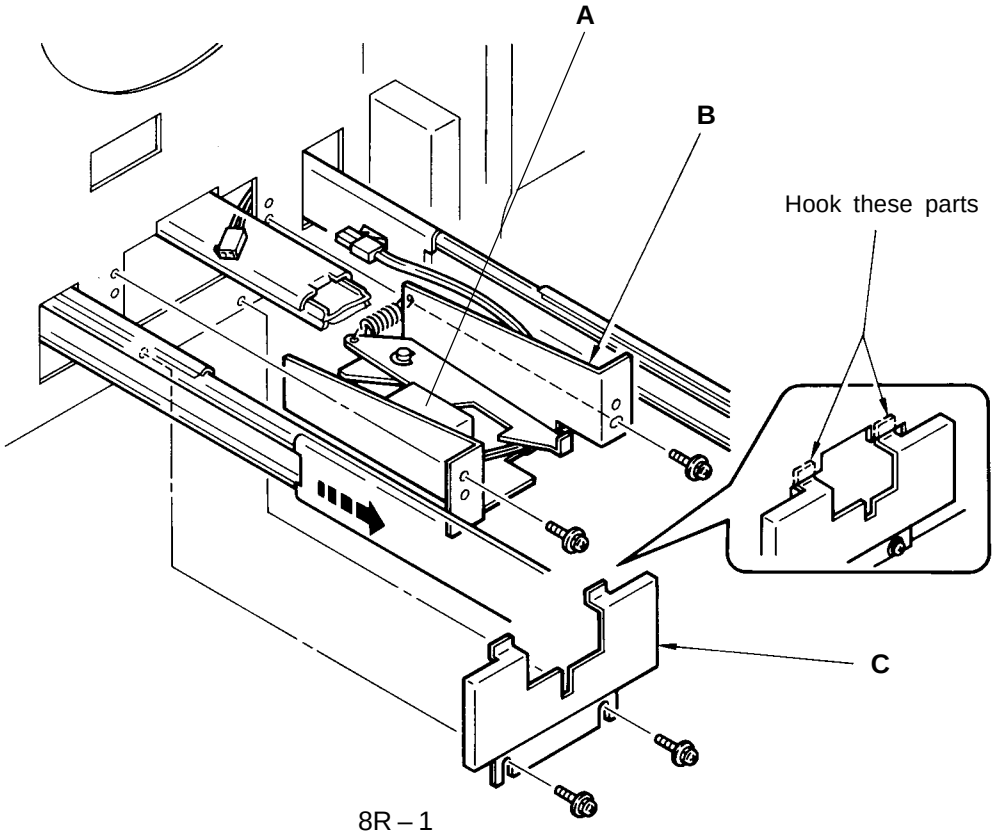
< Removal Procedure >

1. Take out the Drum from the machine and turn OFF the power.
2. Remove the Front right cover and Suction cover plate.
3. Cut the wire clamper holding the wires of the Lock solenoid below the Power supply PCB and disconnect the connector of the Lock solenoid.
4. Remove two mounting screws on the Drum lock cover, and remove the cover.
5. Remove two mounting screws on the Drum lock bracket and pull out the bracket, leading the wires and connector through the hole on the machine side frame.
6. Remove two mounting screws of the Lock solenoid, and remove the solenoid from the bracket.

- Precautions in Assembly -

- Make sure to match the positioning bosses on the Drum lock bracket with the holes of the machine frame.
- Make sure to secure the wires of the Lock solenoid to prevent the Drum rails from catching them.
- Make sure to insert the hooks of the Drum lock cover inside the machine frame as shown in the figure below.

A: Lock solenoid
B: Drum lock bracket
C: Drum lock cover



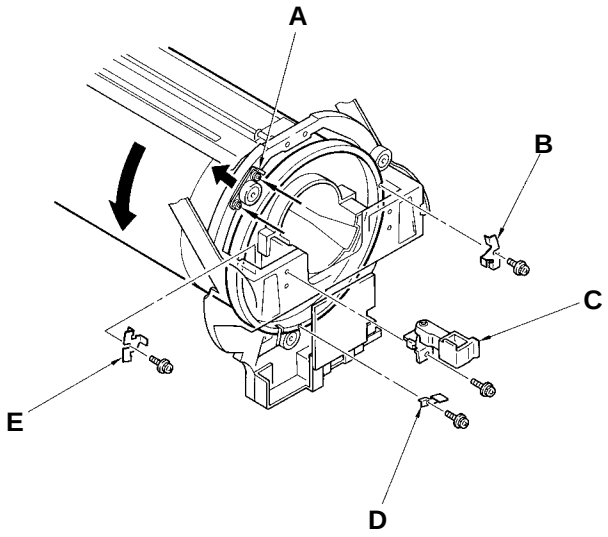
2. Squeegee Unit

< Removal Procedure >

1. Remove the Drum covers.
2. Make a marking on the Drum where the Plate C-2 is attached so that the plate can be reattached to the same position later, then remove the Plate C-2.
3. Remove the Plate C-1.
4. Remove the mounting screw on the Bottle stopper lever, and remove the lever.
5. Loosen two mounting screws on the Support roller adj. plate and slide the Support roller away from the Drum body support (right).

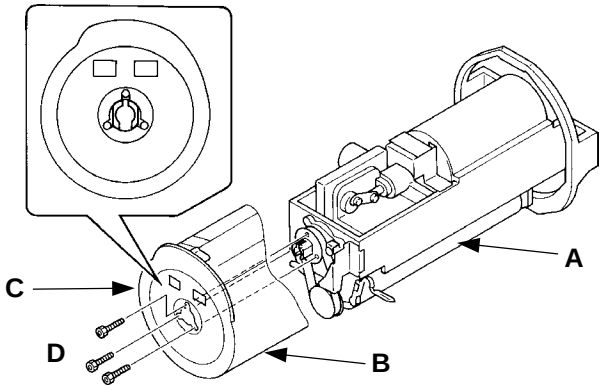
The Drum should be turned in the direction of the arrow after assembly.

A: Support roller adj. plate
B: Plate C-2
C: Bottle stopper lever
D: Plate A
E: Plate C-1



6. Remove three Hexagon socket head screws securing the Squeegee unit to the Drum body support (left), and remove the Squeegee unit from the Drum.

A: Squeegee unit
B: Screen unit
C: Drum body supprt (left)
D: Hexagon socket head Screw



- Precautions in Assembly -

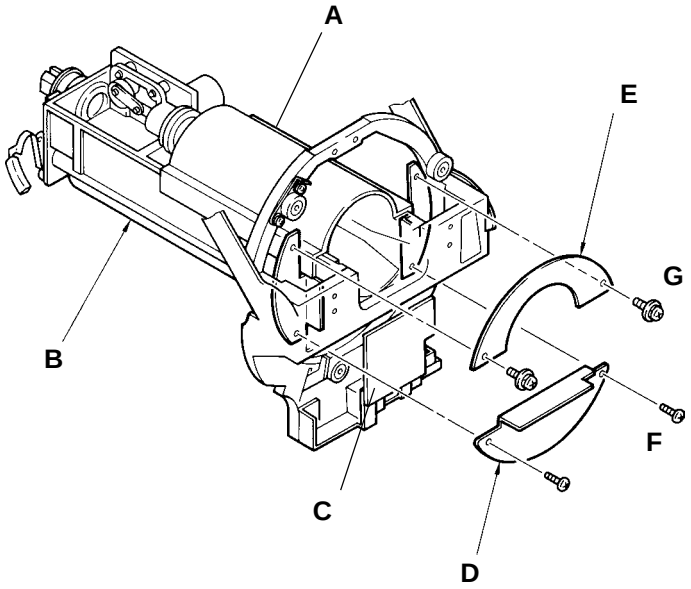
- The position of the Ink blocking plates on both ends of the Squeegee unit should be adjusted before assembling the Squeegee unit into the Drum unit.
- The narrower slit of the Shaft joint should point up when placing the Squeegee unit into the Drum unit.
- Confirm that the Support roller is in contact with the Drum body suppport (right) before tightening the mounting screws on the Support roller adj. plate.

3. Ink Pump Unit, Ink Bottle SW

< Removal Procedure>

1. Take out the Drum from the machine, and remove the Squeegee unit from the Drum.
2. Remove two mounting screws on the Drum cover F (lower), and remove it.
3. Remove two mounting screws on the Drum cover F (upper), and remove it. (Only for A3 Drum).
4. Disconnect the connector for Inking motor (CN4) on the Drum control PCB.
5. Remove four mounting screws on the Bottle guide (Only for A3 Drum).

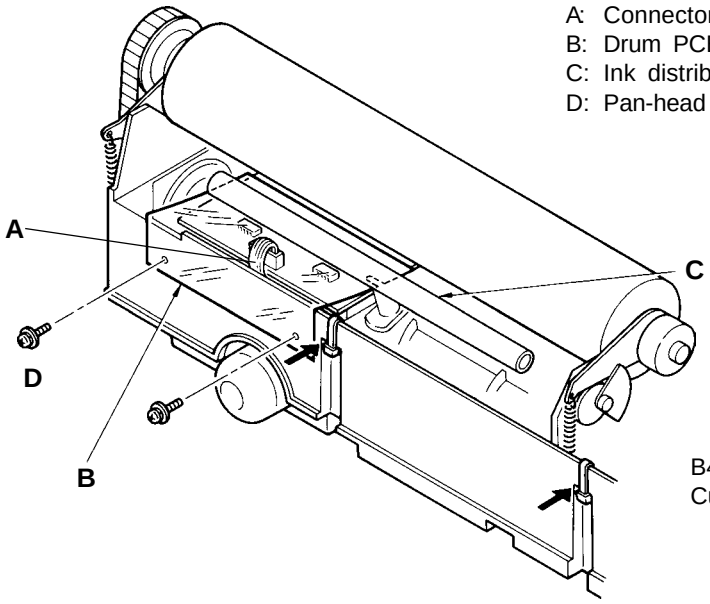
A: Bottle guide
B: Squeegee Unit
C: Drum control PCB
D: Drum cover F(lower)
E: Drum cover F(upper)
F: Bind-head Screw M3x6
G: Pan-head Screw M3x8



6. Turn over the Squeegee unit and remove the Drum PCB cover by removing two mounting screws. Disconnect the connector on the Drum PCB.

A: Connector
B: Drum PCB cover
C: Ink distributor
D: Pan-head Screw SW.W M3x8

The Drum PCB cover shoud be placed between the Ink distributor and the Drum PCB.

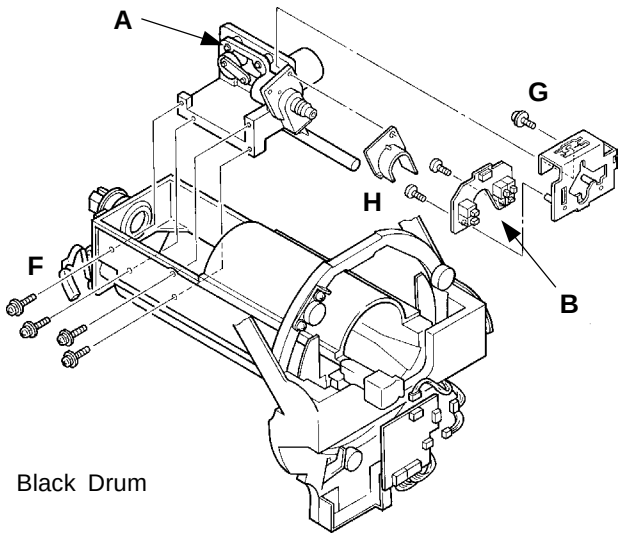


B4 Drum:
Cut off the wire clamper binding the wires.

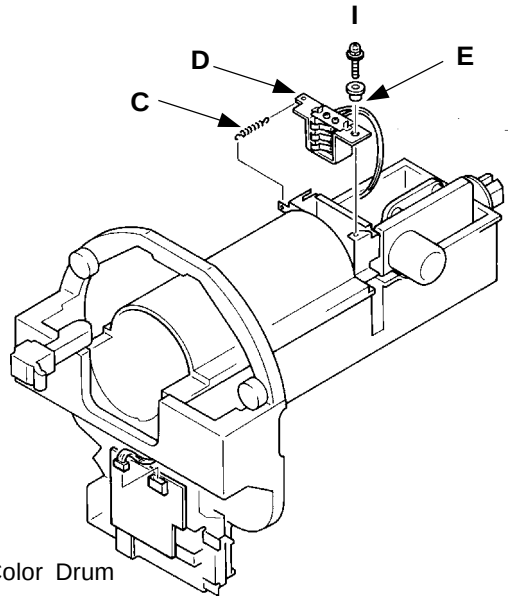
Black Drum

7. Disconnect the connector on the Ink bottle SW, and remove four mounting screws of the Inking pump unit and take the unit out.
8. Remove the mounting screw of Ink bottle SW bracket, and remove it from the Inking pump unit.
9. Remove two mounting screw on the Ink bottle SW, and remove the SW.

A: Ink Pump Unit
B: Ink bottle set SW
C: Bottle SW spring
D: Ink bottle SW
E: Bottle SW boss
F: Pan-head Screw SW.W M4x10
G: Pan-head Screw SW.W M4x8
H: Bind-head Screw M3x6
I: Pan-head Screw SW.W M3x8



Black Drum



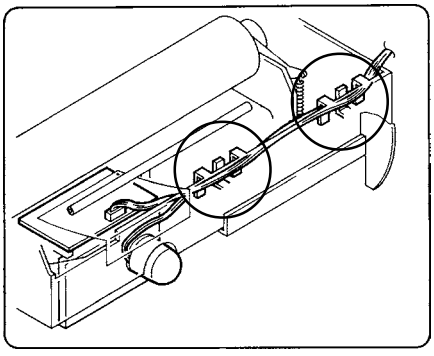
Color Drum

Color Drum

7. Remove four mounting screws of the Inking pump unit and take the unit out.
8. Disconnect the connector of the Ink bottle SW and remove the Bottle SW spring.
9. Remove the mounting screw on the Ink bottle SW, and remove the SW.

- Precaution in Assembly -

Lead the wire coming out of the Inking motor and Drum PCB through the hooks on the frame of the Squeegee unit as shown in the figure below. (A3 Drum)

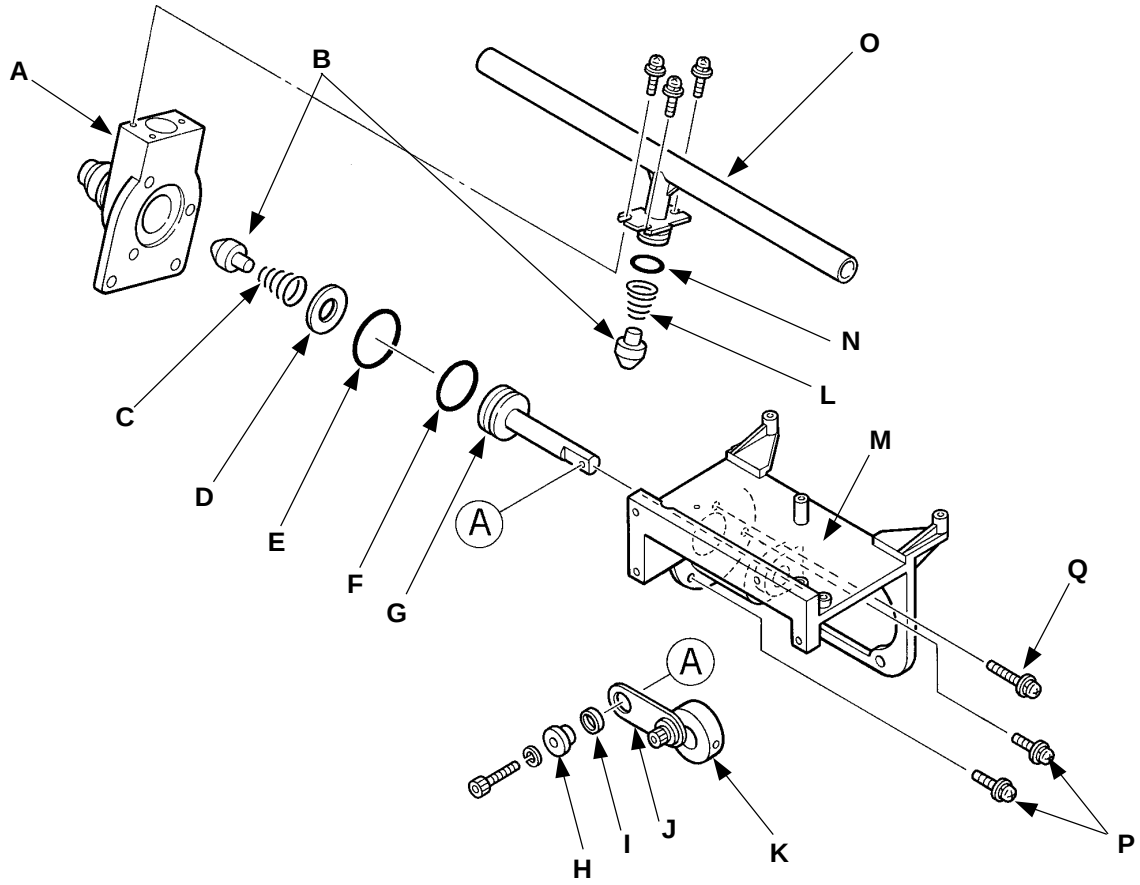


Disassembly of Ink pump Unit

- Removal and Disassembly -

1. Take out the Drum from the machine, and remove the Squeegee unit from the Drum.
2. Remove four mounting screws on the Ink pump unit, and remove the unit.
3. Disassemble the Ink pump unit as shown in the figure below.

A: Ink pump body
B: Valve
C: Coil Spring (Silver, Weak)
D: ϕ10 Plain Washer
E: P22-2.4 O-ring
F: P14-2.4 O-ring
G: Piston
H: Collar holder
I: Collar
J: Link Plate
K: Linking disc
L: RC Coil Spring (Golden, Strong)
M: Inking motor bracket
N: P10A-2.4 O-ring
O: Ink distributor
P: Pan-head Screw SW.W M4x12
Q: Pan-head Screw SW.W M4x16



LED INK Ink sensor
– Light up when ink is not detected
FLOW Overflow sensor
– Light up when ink is not detected
Test Mode No.37 Ink sensor
– short interval beeps when ink is detected
No.38 Overflow sensor
– Short interval beeps when ink is detected
No.101 Ink Supply

4. Inking Motor

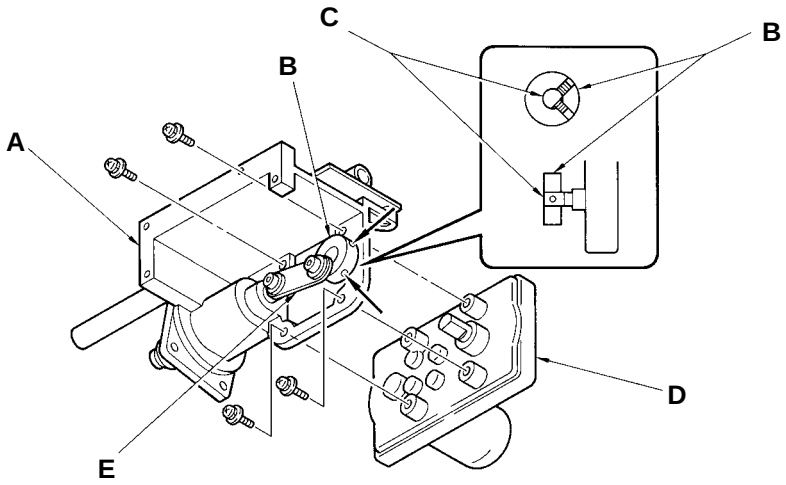
< Removal Procedure >

1. Remove the Inking Pump Unit from the Squeegee unit.
2. Loosen two allen screws securing the Linking disc on the shaft of the Inking motor.
3. Remove four mounting screws of the Inking motor and remove the motor.

- Precautions in Assembly -

- The Linking disc should be secured on a level with the end of the Inking motor shaft. Either of two allen screws in the disc should be set against the flat cut face of the shaft.

A: Inking motor bracket
B: Linking disc
C: Inking motor shaft
D: Inking motor
E: Linking plate



5. Drum PCB

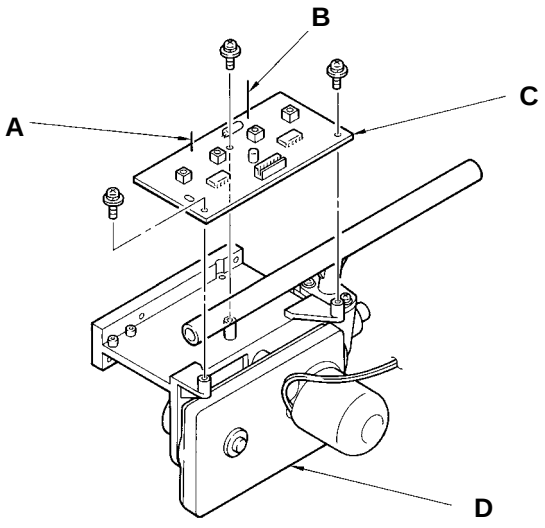
< Removal Procedure >

1. Remove the Inking Pump Unit from the Squeegee unit.
2. Remove three mounting screws on the Drum PCB, and remove the PCB.

- Precautions in Assembly -

- The Ink sensor and Overflow sensor should be set upright on the Drum PCB.

A: Overflow sensor
B: Ink sensor
C: Drum PCB
D: Inking pump unit



6. Squeegee Belt

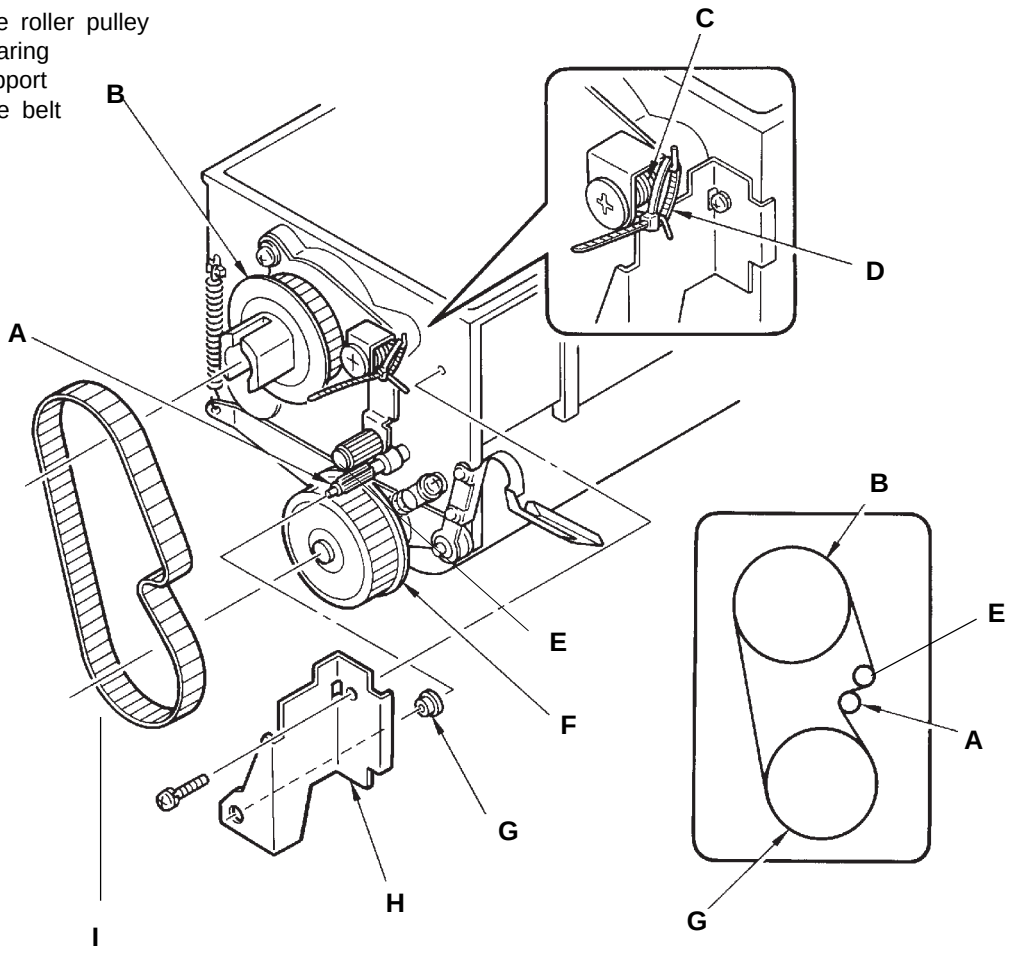
< Removal Procedure >

1. Remove the Squeegee unit from the Drum.
2. Wind a wire clamper on the Tensioner spring to prevent the Tensioner from giving tension on the Squeegee belt as shown in the figure below.
3. Remove the mounting screw on the Shaft support, and remove the Shaft support and a metal bearing at the end of the Ink driving shaft.
4. Remove the Squeegee belt from the pulleys.

- Precautions in Assembly -

- Confirm that the securing screw (allen screw) in the Main shaft pulley is not loose before putting the belt on it.
- Make sure to put a metal bearing on the end of the Ink driving shaft.
- Make sure to cut the wire clamper wound on the Tensioner spring after assembly.

A: Ink driving shaft
B: Main shaft pulley
C: Tensioner spring
D: Wire clamper
E: Tensioner
F: Squeegee roller pulley
G: Metal bearing
H: Shaft support
I: Squeegee belt

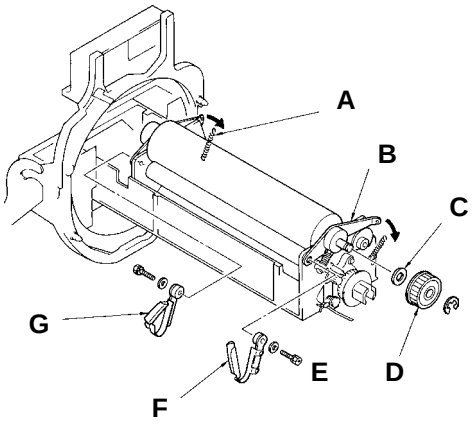


7. Squeegee Roller

< Removal Procedure >

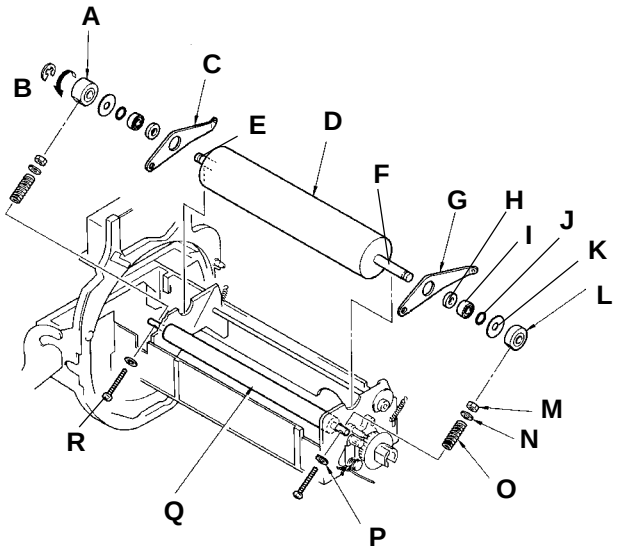
1. Remove the Squeegee unit from the Drum.
2. Remove the E ring at the one end of the Squeegee roller shaft, and remove the Squeegee roller pulley and a plain washer behind it.
3. Remove the securing screws on the Ink blocking plates (front and back), and remove the plates.
4. Unhook the Squeegee adj. Plate springs from the Squeegee adj. Plate.

A: Squeegee adj. plate spring
B: Squeegee adj. plate
C: Plain washer
D: Squeegee roller pulley
E: Hexagonal Screw with spring washer, Plain washer
F: Ink blocking plate (back)
G: Ink blocking plate (front)



5. Loosen the Locking nuts on the adjustment screws securing the Reverse rotation stoppers (A and B) and remove the adjustment screws from the Reverse rotation stoppers.
6. Hold up the Squeegee roller and take it out of the Squeegee unit.

A: Reverse rotation stopper A
B: Arrow indicates idling direction
C: Squeegee adj. plate (front)
D: Squeegee Roller
E: Short Shaft
F: Long Shaft
G: Squeegee adj. plate (back)
H: Spacer (Only A3 Machine)
I: Bearing
J: O-ring
K: Washer
L: Reversal rotation stopper B
M: Locking nut
N: Washer (Small)
O: Spring
P: Plain Washer (Large)
Q: Doctor Roller
R: Adjustment screw



- Precautions in Assenbly -

- Be careful not to attach the Squeegee adj. Plates and Reverse rotation stoppers to a wrong end of the Squeegee roller sfaft because the length of the shaft is different at both ends.
  - The bent part of the Squeegee adj. Plate should face outward.
  - The Reverse rotation stopper A (thicker one) shoud be put on the shorter shaft.
- Confirm that the reverse rotation stopper A rotates on the shaft in the arrow-indicating direction as shown in the figure below before securing it with the adjustment screw because the Reverse rotation stopper A has an one-way clutch built-in.

- Adjustment after Assembly-

- Squeegee Gap (page 8A-1)

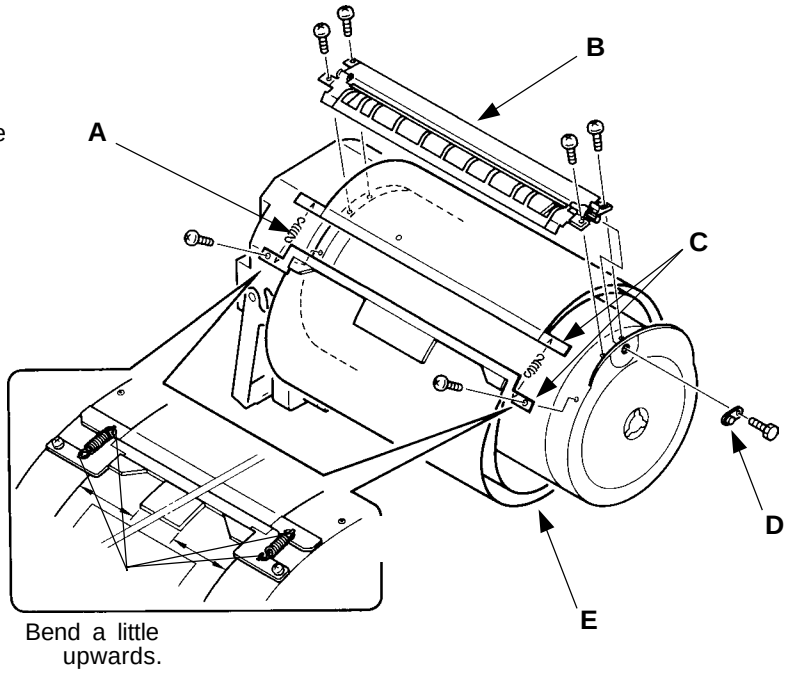
8. Screens <A3/Ledger>

< Removal Procedure >

1. Put a blank master on the Drum by the confidential operation and pull out the Drum from the machine, keeping the Drum installed on the Drum holder.
2. Remove the mounting screw on the Angular magnet plate and remove the plate.
3. Remove four mounting screws on the Clamp plate base and remove it.
4. Remove the Screen springs from the hooks on both sides of the Screens.
5. Remove two securing screws on the Screens and peel the Screens off the Drum body, holding the attachment plates at both edges.

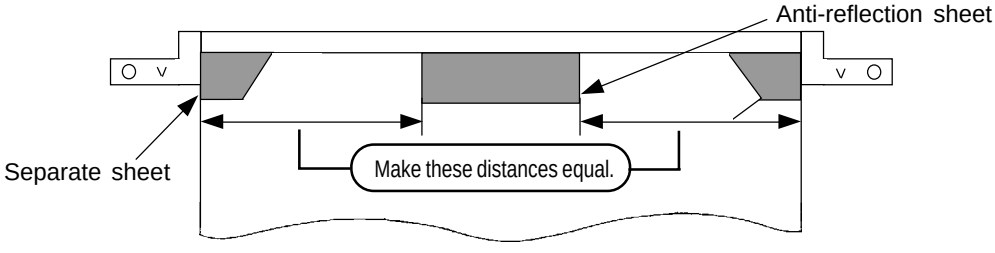
[IMPORTANT]
Be careful not to crease the Screens when peeling them off the Drum body.

A: Screen spring
B: Clamp plate base
C: Attachment plate
D: Angular magnet plate
E: Screens



- Precautions in Assembly -

- Take care not to crease the Screens when handling them.
- Paste the following parts on the Screen as indicated in the figure below before assembly: Separate sheets and Anti-reflection sheet.
- After securing the Clamp plate base, always confirm that the Clamp plate can be smoothly opened and closed by hand.
- Attach the Angular magnet plate so that the magnet can be placed on the opposite side of the Clamp plate.

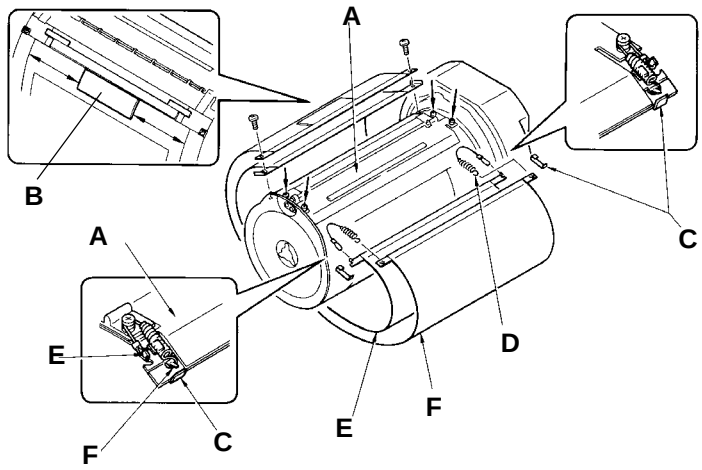


9. Screens <B4/A4/Legal>

< Removal Procedure >

1. Put a blank master on the Drum by the confidential operation and pull out the Drum from the machine, keeping the Drum installed on the Drum holder.
2. Remove the Screen springs from the hooks on both sides of the Screens.
3. Loosen four mounting screws on the Clamp plate base.
4. Remove two securing screws on the Screens and slide out the attachment plates (metal) at both edges of the Screens from under the Clamp plate base.
   [IMPORTANT]
   Be careful not to drop the Hanger plates when sliding out the attachment plate at the tail edge.
5. Peel the Screens off the Drum body, holding the attachment plates at both edges.
   [IMPORTANT]
   Be careful not to crease the Screens when peeling them off the Drum body.

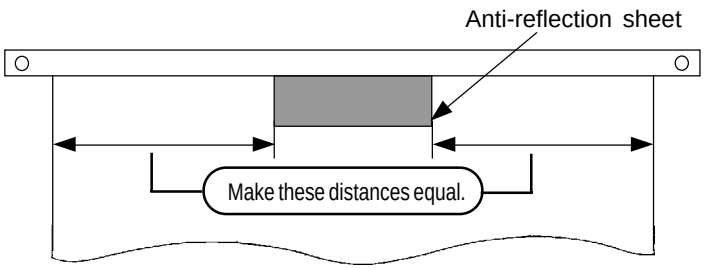
A: Clamp plate base
B: Anti-reflection sheet
C: Hanger plate
D: Screen spring
E: Screen A
F: Screen B



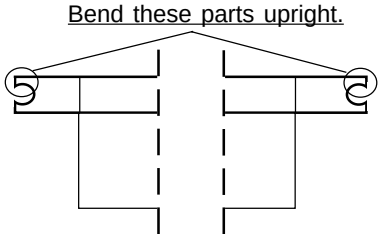
- Precautions in Assembly -

- Take care not to crease the Screens when handling them.
- Paste the Anti-reflection sheet on the Screen B as indicated in the figure below before assembly.
- Bend upright the parts at the tail edge of the Screen A which are indicated in the figure below before assembly.
- Make sure to hook the Hanger plates on the attachment plate of the Screen A from the bottom, and the Screen springs from outside to inside as indicated in the figure above.
- After securing the Clamp plate base, always confirm that the Clamp plate can be smoothly opened and closed by hand.

[Screen B]



[Screen A]



10. Drum Body

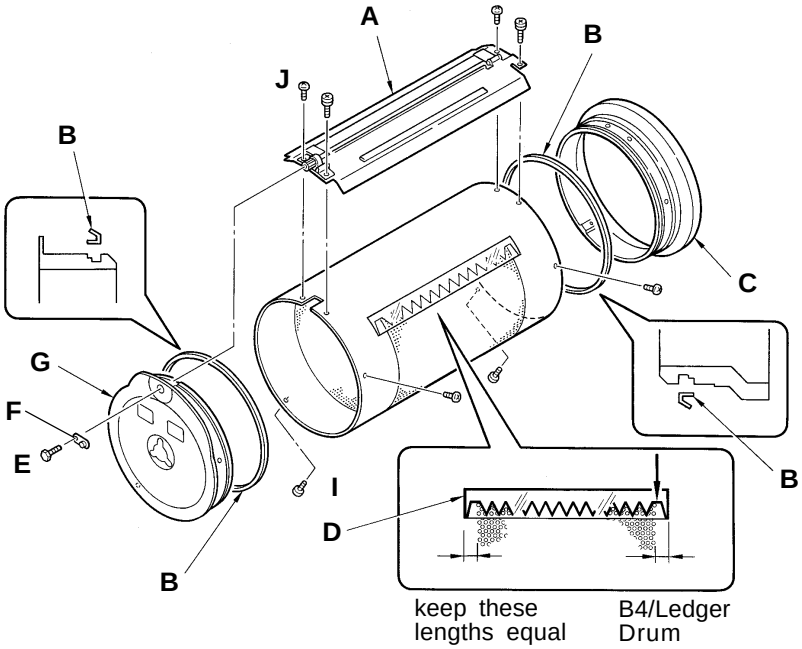
< Removal Procedure >

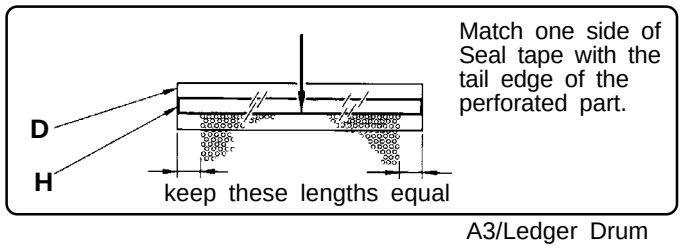
1. Remove the Screens from the Drum, referring to the previous page.
2. Unload the Drum from the Drum.
3. Remove the Squeegee unit from the Drum.
4. Remove the mounting screw on the Angular magnet plate, and remove the plate.
5. Remove four mounting screws on the Clamp plate base and remove it.
6. Remove the respective two securing screws of the Drum body supports (left and right), and remove the Drum body supports from the Drum body.

- Precautions in Assembly -

- The Drum seal should be put on the Drum body supports in the way described in the figures below.
  Always put grease on the Drum seal before assembly to allow smooth insertion of the Drum body supports into the Drum body.
- Make sure to secure the Drum body supports to the Drum body, pulling them outward.
- Attach the Ink blocking sheet and Seal tape onto the Drum body as shown in the figure below.
- Attach the Angular magnet plate so that the magnet can be placed on the opposite side of the Clamp plate.
  After assembly, confirm that the Angular magnet plate is placed on the same level in both cases when the Clamp plate is open and when it is closed.

A: Clamp plate base
B: Drum seal
C: Drum body support (right)
D: Ink blocking sheet
E: Angular magnet screw
F: Angular magnet plate
G: Drum body Support (left)
H: Seal tape
I: Bind-head Screw M4x8
J: Bind-head Screw M4x8





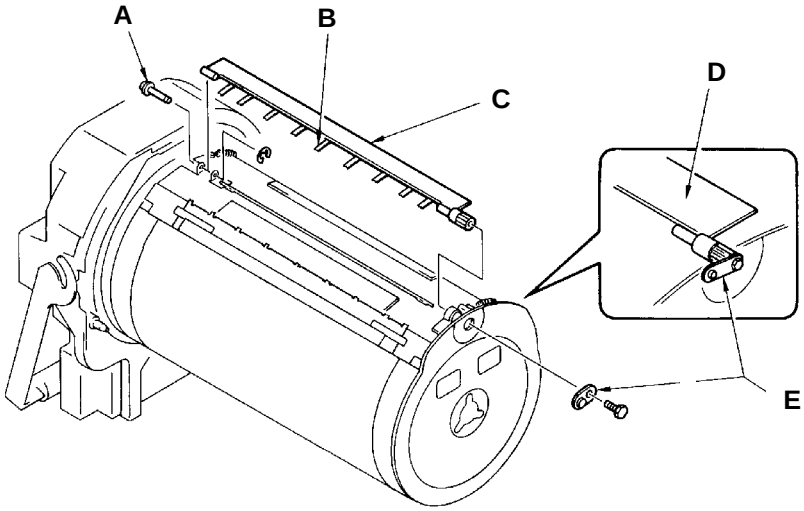
A3/Ledger Drum

11. Clamp Plate Ass'y

< Removal Procedure >

1. Remove the Drum from the machine.
2. Remove the mounting screw on the Angular magnet plate, and remove the plate.
3. Remove an E ring at one end of the Clamp plate shaft, and pull out the shaft.
4. Cut the strips of the Clamp plate sheet.
5. Remove the Clamp plate ass'y, leading the Clamp plate gear through the Compensator.

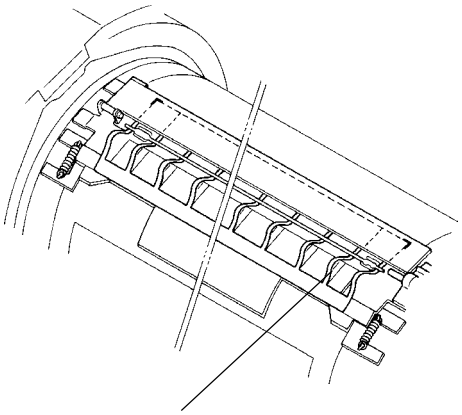
A: Clamp plate shaft
B: Clamp plate sheet
C: Clamp plate ass'y
D: Clamp plate
E: Angular magnet plate



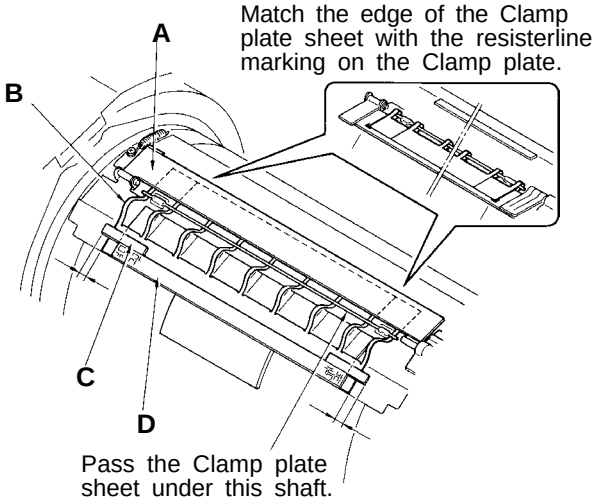
- Precautions in Assembly -

- Attach the following parts on the Drum and Clamp plate ass'y as indicated in the figure below: Clamp plate sheet, Drum sheets and Sticker sheet.
- Attach the Angular magnet plate so that the magnet can be placed on the opposite side of the Clamp plate. After assembly, confirm that the Angular magnet plate is placed on the same level in both cases when the Clamp plate is open and when it is closed.

A3/Ledger Drum



B4/A4/Legal Drum


Match the edge of the Clamp plate sheet with the resisterline marking on the Clamp plate.
A
B
C
D
Pass the Clamp plate sheet under this shaft.

A: Clamp plate
B: Clamp Plate sheet
C: Drum sheet
D: Sticker sheet

ADJUSTMENT

1. Squeegee Gap

1. Remove the Squeegee unit from the Drum.
2. Clean ink inside the Squeegee unit.
3. Check if the gap between the Doctor roller and the Squeegee roller is as indicated below at any point from end to end, by inserting a thickness gauge between the rollers.

A3 or Ledger Drum : **0.07 ± 0.02 mm**	B4, A4 or Legal Drum : **0.10 ± 0.02 mm**

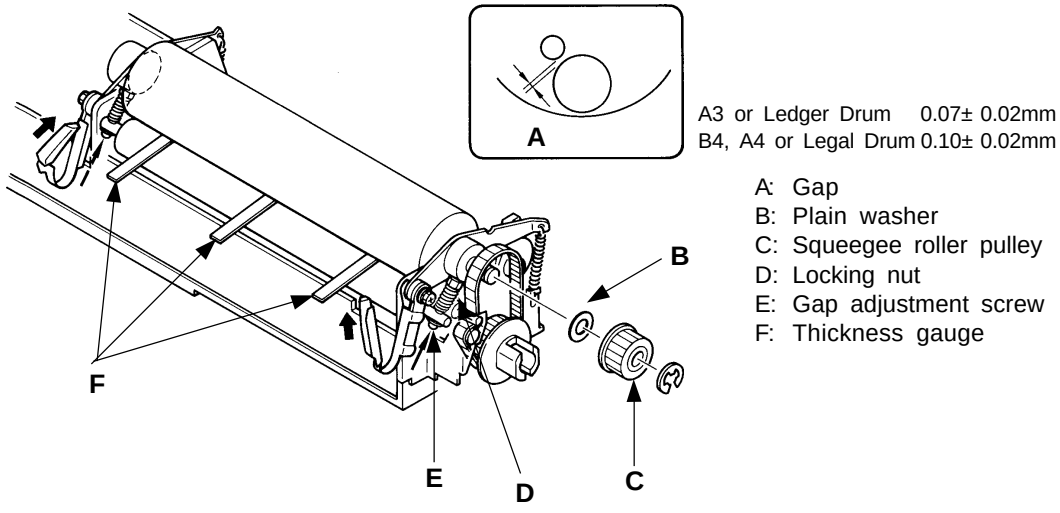
4. If not, adjust the gap following the procedures described below.
   1) Remove the Squeegee belt.
   2) Remove an E ring at one end of the Squeegee roller shaft, and remove the Squeegee roller pulley.
   3) Loosen the mounting screws on the Ink blocking plates (front and back) and turn them down to make space for adjustment.
   4) Loosen the locking nuts on the gap adjustment screws on both ends of the Squeegee roller.
   5) Insert a thickness gauge between the Doctor roller and Squeegee roller, and turn the gap adjustment screws to obtain the correct gap at any check point.
   6) Tighten the locking nuts, holding the gap adjustment screws in this condition with a screw driver, and then check the gap again.

- Precautions in Adjustment -

- Make sure that the gap is equal at both ends of the Squeegee roller.
- When the locking nuts are fastened, the gap will be slightly widened.
- One turn of the adjusting screw moves the gap by 0.5 mm.
- Always adjust the position of the Ink blocking plates after adjusting the Squeegee gap.
- The squeegee roller pulley has a one-way clutch.(The collar of the pulley should face inside.)

- Results of Misadjustment -

- If the gap is too wide;
  too much ink will be transferred to the inner surface of the Drum body, causing ink leakage at the tail edge of the perforated part of the Drum body.
- If the gap is too narrow;
  ink will not spread over the surface of the Squeegee roller well, causing uneven printing.



A3 or Ledger Drum 0.07± 0.02mm
B4, A4 or Legal Drum 0.10± 0.02mm

A: Gap
B: Plain washer
C: Squeegee roller pulley
D: Locking nut
E: Gap adjustment screw
F: Thickness gauge

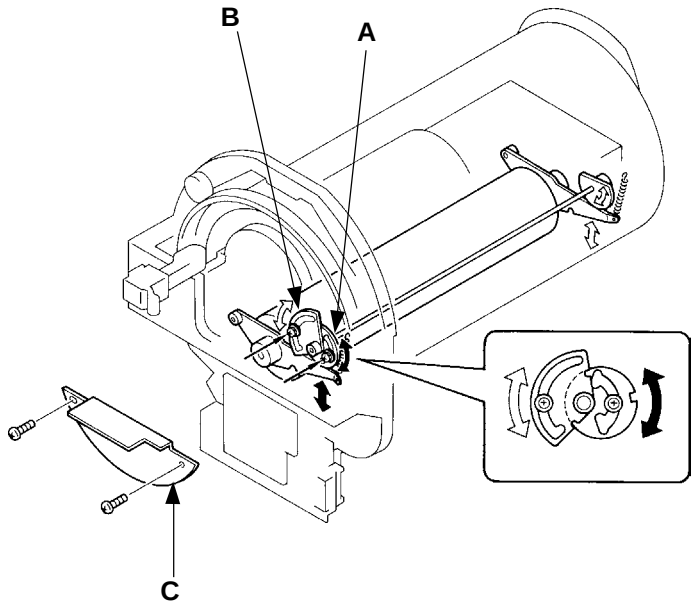
2. Squeegee Pressure Balance

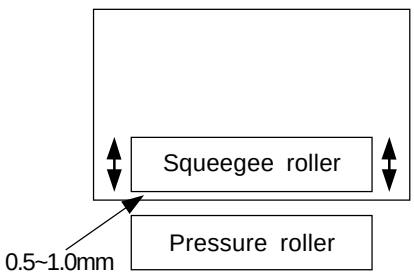
1. Make a master with Test chart as an original.
2. Set the print density at **1** (lowest) and prints.
3. Check if the print density is even on both (right and left) sides of printed copies.
4. If not, adjust the Squeegee pressure balance following the procedures described below.
   1) Remove the Drum cover (lower).
   2) Remove the Drum cover F (lower) by which the **Adjustment plate** and **Adjustment collar A** become accessible.
   3) If the density is darker on the drive mechanism side of printed copies, loosen the securing screw on the **Adjustment plate** and turn the plate counter-clockwise.
      If the density is darker on the operation panel side, loosen the securing screw on the **Adjustment collar A** and turn the collar counter-clockwise.
   4) If the density is too light on the whole, turn both the **Adjustment plate** and **Adjustment collar A** clockwise to adjust the entire density.
   5) After adjustment, check that the gap between the Squeegee roller and the Drum body is **0.5 to 1.0mm**, by pressing the Drum body just under the Squeegee roller from outside with a finger.
      If not, re-adjust the Squeegee pressure balance by following the procedure in the step 4.
   6) Perform the confidential operation to place a blank master on the Drum and feed **500 sheets of paper at the lowest speed**. Then check that no ink leaks at any point on the Drum body.
      If ink leaks, re-adjust the Squeegee pressure balance by repeating the procedures in the steps 3 to 5 above.

- Results of Misadjustment -

- If the Squeegee pressure differs much between the front and back sides of the Drum; the print density will be uneven on both sides of printed copies.
- If the Squeegee pressure is too high; too much ink will be transferred to the inner surface of the Drum body, causing ink leakage at the tail edge of the perforated part of the Drum body.
- If the Squeegee pressure is too low; the print density will be weak or too much stress will be applied to the Drum body to shorten its life.

A: Adjustment collar A (for front side)
B: Adjustment plate (for back side)
C: Drum cover F(lower)





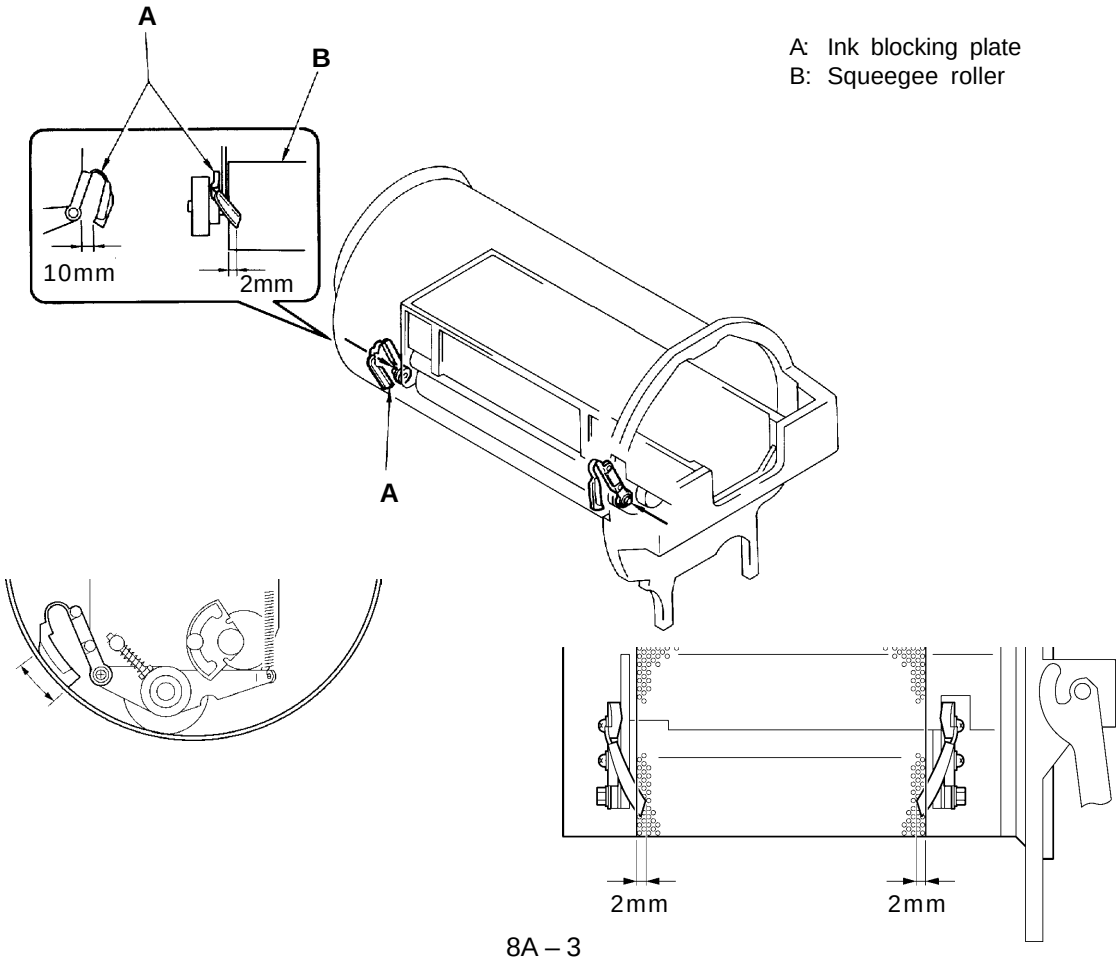
3. Position of Ink Blocking Plates

1. Remove the Squeegee unit from the Drum.
2. Remove the Drum cover F (lower).
3. Check if the tip of the Ink blocking plate is **10mm or more** away from the mounting screw on it and is **about 2mm** inside the end of the Squeegee roller at each end of the Squeegee roller, as shown in the figures below.
4. If not, reform the Ink blocking plate by hand to place the plate in the above-mentioned position.
5. Check if the Ink blocking plate is in close contact with the inner surface of the Drum body after installing the Squeegee unit into the Drum.
6. If not, loosen the mounting screw on the Ink blocking plate and adjust the position to put the plate into contact with the Drum body.

[Note]
The Ink blocking plates prevent ink from spreading sideways and keep ink within the print area.

- Results of Misadjustment -

- If the Ink blocking plates are set too inside;
  ink will be scraped off on sides within the print area, causing missing images on sides on printed copies.
- If the Ink blocking plates are set far from the Squeegee roller or it is not in close contact with the inner surface of the Drum body;
  excess ink will not be scraped off outside the print area, causing ink to leak from the sides of the Drum body.



A: Ink blocking plate
B: Squeegee roller

4. Drum Position A (Drum Home Position)

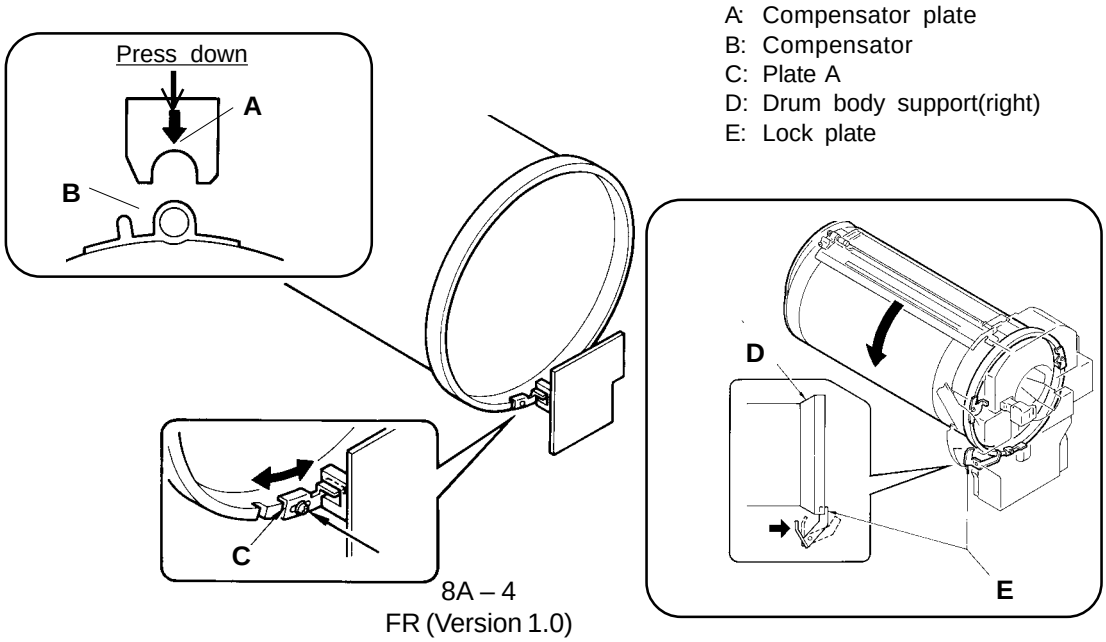
1. Turn ON the power and open the Front cover.
2. Press the Drum home position button to bring the Drum to the Position A.
3. Open the Scanner table and press down the Compensator plate manually to confirm that the Compensator plate engages right with the Compensator on the Drum to secure gear engagement.
4. If the Compensator plate does not engage with the Compensator or if the Drum moves when they engage, pull out the Drum from the machine and remove the Drum cover (upper).
   [Note]
   It will be easier to make adjustment if the Drum is kept on the Drum holder.
5. Release the Drum from the rotation lock by manually pressing the Lock plate behind the Drum body support (right) and rotate the Drum manually until you can reach the Plate A.
   [IMPORTANT]
   Rotate the Drum only in the direction indicated by the arrow in the figure below because the reverse rotation will deform the Ink blocking plates.
6. Loosen the mounting screw on the Plate A and adjust the position of the plate to ensure a right gear engagement.
7. Rotate back the Drum to the home position and install it in the machine. Then press the Drum home position button to set the Drum at the Position A for checking gear engagement.
8. Check gear engagement by repeating the procedure in the step 3 above.
   When a right gear engagement is obtained, pull out the Drum and put back on the Drum cover (upper).

- Precautions in Adjustment -

- Close the Scanner table when pressing the Drum home position button because the Drum is prevented from rotating by a safety interlock sw when it is open.
- If the clamp unit is manually lowered, “T14” will be displayed, judging it a clamp error(2). Press the ALL RESET key to reset it.
- If the Drum cover (lower) is removed, the Drum set lever of the drum holder will not be pressed, disabling the drum from entering. It is recommended to fix the lever with tape, and so on.

- Results of Misadjustment -

- If a right gear engagement is not secured when the Drum is at the Position A;
  the Clamp motor will not smoothly open or close the Clamp plate in master removal and loading operations and, as a result, the error code **[T3]** will be displayed on the operation panel.



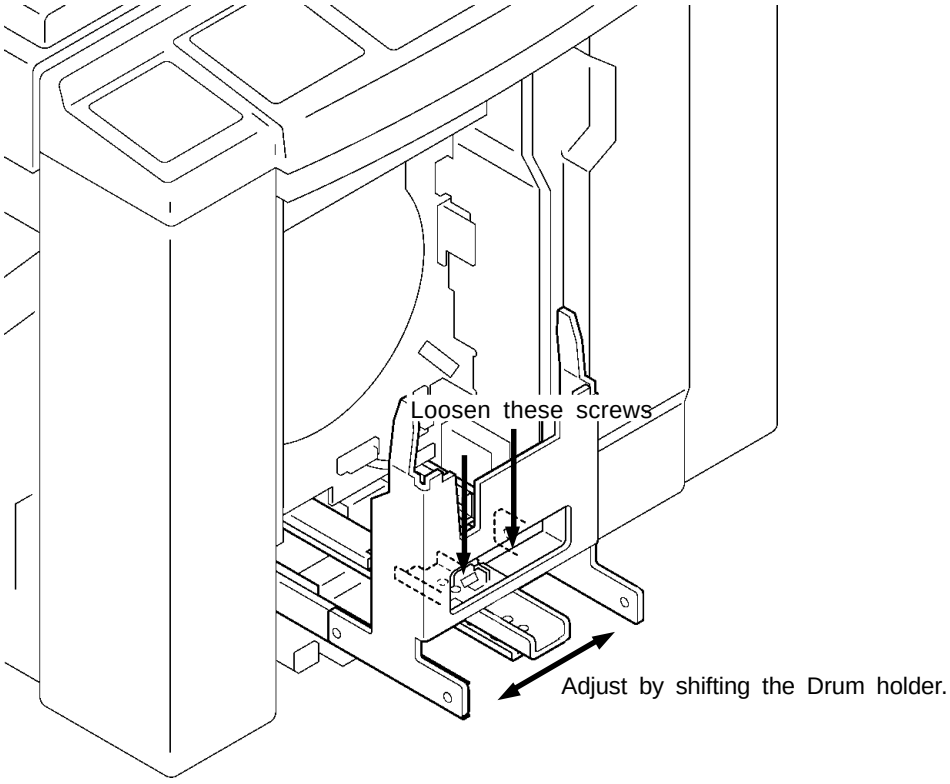
5. Position of Drum Holder

- Checking -

- When you press the Drum home position button to remove the drum from the main body, check whether it can be easily removed with one finger.
- When the Drum is engaged with the main shaft, check whether the drum body support(left) moves to the paper receiving side or paper feed side. Then, determine to which side adjustment should be made.

- Method-

1) Pull out the Drum from the main body and remove the Drum from the Drum holder.
2) Loosen two screws used to fix the Drum rail in the center and the Drum holder, and adjust the holder position to the left/right.
3) Put the Drum on the drum holder and check again how smoothly the Drum can be engaged and disengaged.



MEMO

CHAPTER 9: PAPER JAMS

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PAPER JAMS

LED PSEN Paper sensor
– Light up when light path is blocked
RCV1 Paper receiving sensor 1
– Light up when light path is blocked
RCV2 Paper receiving sensor 2
– Light up when light path is blocked

1. Paper Jams

Three sensors, i.e. Paper sensor, Paper receiving sensors 1 and 2, watch for any paper jam in the machine during the printing operation.
The paper jams are divided into the following four cases.

1) Paper Jam in the First Paper Feed Area

The Paper sensor checks whether the paper is correctly supplied into the machine from the Paper feed tray during the printing operation.

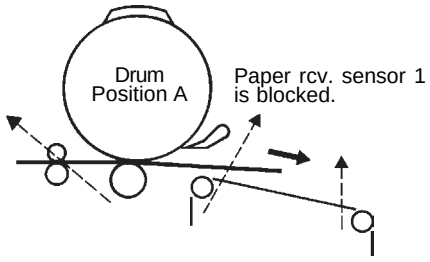
- In printing operation, if the Paper sensor does not detect any paper before the Drum comes to the Drum Position A for the third time, i.e. the Drum has turned three times without the light path of the Paper sensor blocked, the machine assumes that the paper has jammed in the first paper feed area and “PAPER MIS FEED CHECK PAPER FEED AREA AND PRESS ALL RESET KEY” is displayed.

2) Paper Jam in the Second Paper Feed Area / Paper Jam under the Drum

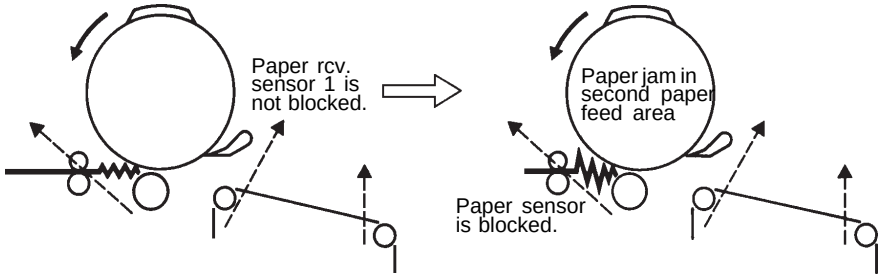
The Paper receiving sensor 1 checks whether the paper is correctly discharged out from the machine during the printing operation.

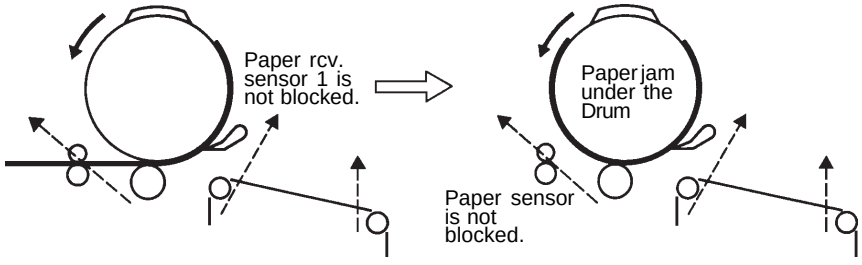
- If the light path of the Paper receiving sensor 1 is not blocked by a sheet of paper when the Drum comes to the Drum Position A, the machine assumes that the paper has jammed.
  The machine assumes that the paper has jammed in the second paper feed area if the paper sensor detects a sheet of paper at the next Drum Position A. “PAPER JAM CHECK PAPER FEED AREA” is displayed.
  The machine assumes that the paper has jammed under the Drum if the Paper sensor does not detect any paper at this second Drum Position A. “PAPER JAM ON DRUM REMOVE PAPER” is displayed.

Normal paper feeding



First Drum Position A **Next Drum Position A**





PAPER JAMS

Test Mode No.6 Paper sensor
– Short interval beeps when light path is blocked
No.19 Paper receiving sensor 1
– Short interval beeps when light path is blocked
No.20 Paper receiving sensor 2
– Short interval beeps when light path is blocked

3) Paper Jam at Paper Receiving Sensor 1

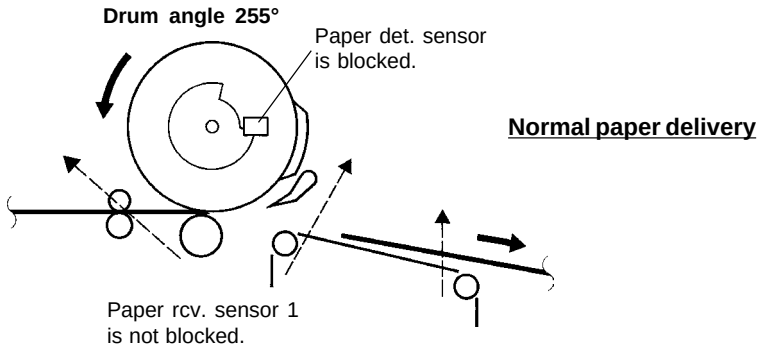
The Paper receiving sensor 1 checks whether the printed paper is correctly delivered from the printing area onto the Suction unit.

3-1 Timing of detection: Pressure detection sensor

- During the printing operation, if the Paper receiving sensor 1 does not detect any paper when the condition of the light path of the Pressure detect sensor changes from "open" to "blocked", the machine assumes the paper delivery on the Suction unit is normal.
  If the Paper receiving sensor 1 detects a sheet of paper at the above condition, the machine assumes the paper has jammed at the Paper receiving sensor 1 and “PAPER JAM UNDER DRUM PULL OUT DRUM” is displayed.

3-2 Timing of detection: Drum angle

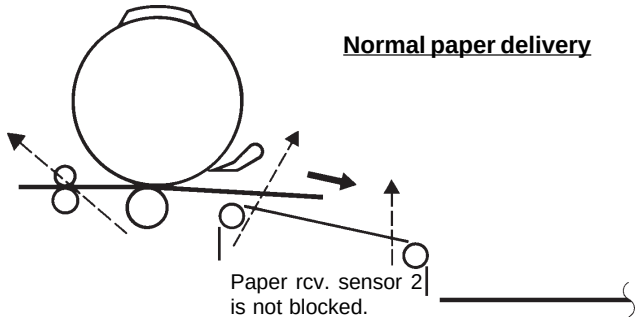
- During the printing operation, if the Paper receiving sensor 1 does not detect any paper when the Drum rotates 255° from the Position A, the machine assumes the paper delivery on the Suction unit is normal.
  If the Paper receiving sensor 1 detects a sheet of paper at the above condition, the machine assumes the paper has jammed at the Paper receiving sensor 1 and “PAPER JAM UNDER DRUM PULL OUT DRUM” is displayed.



4) Paper Jam at Paper Receiving Sensor 2

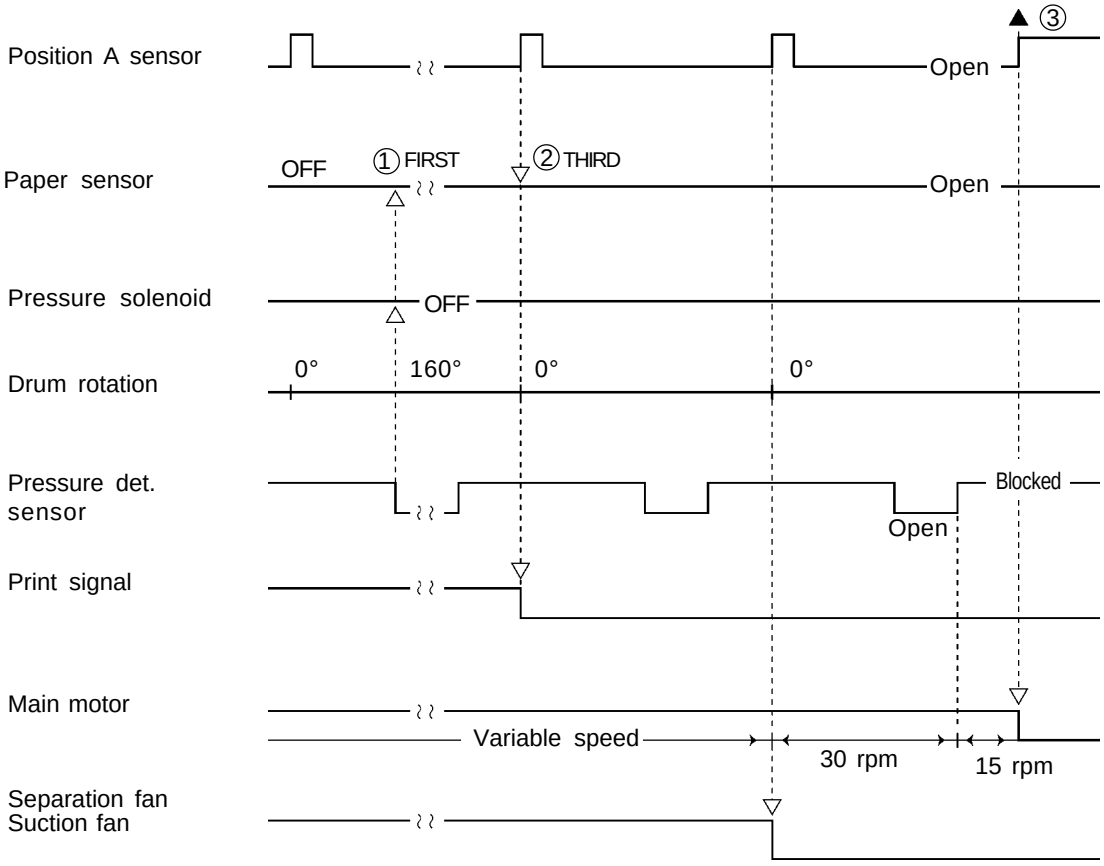
The Paper receiving sensor 2 checks whether the printed paper is correctly delivered on the Suction unit to the Paper receiving tray.

- During the printing operation, if the condition of Paper receiving sensor 2 changes from "paper detection" to "no paper detection" or vice versa, before the Drum Position A is checked twice, the machine assumes the paper delivery onto the Paper receiving tray is normal.
  If the Paper receiving sensor 2 keeps detecting a sheet of paper while the Drum Position A is checked twice, the machine assumes the paper has jammed at the Paper receiving sensor 2 and “PAPER JAM UNDER DRUM PULL OUT DRUM” is displayed.



- Timing Chart -

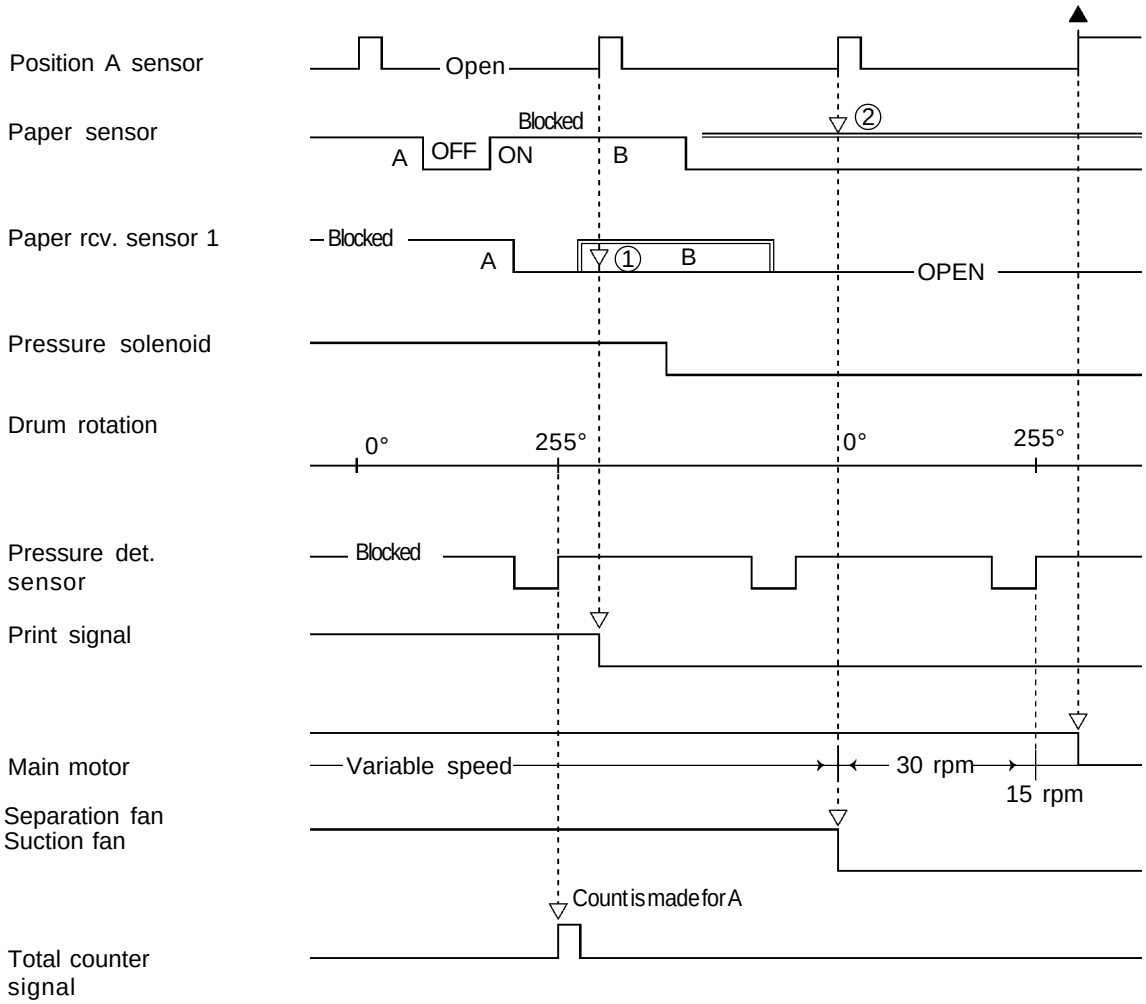
Paper Jam in the First Paper Feed Area



① If the light path of the Paper sensor is not blocked at Drum angle 160° (or the light path of the Pressure detection sensor is opened), the Pressure solenoid will not be turned ON.
② If the Paper sensor has detected no paper by the time the Drum makes its third turn, the machine assumes that the **paper has jammed at the First paper feed area**, and turns OFF the Print signal.
③ When the Drum stops, the error code “PAPER MISFEED CHECK PAPER FEED AREA AND PRESS ALL RESET KEY” is displayed.

- Timing Chart -

Paper Jam in the Second Paper Feed Area / Paper Jam under the Drum

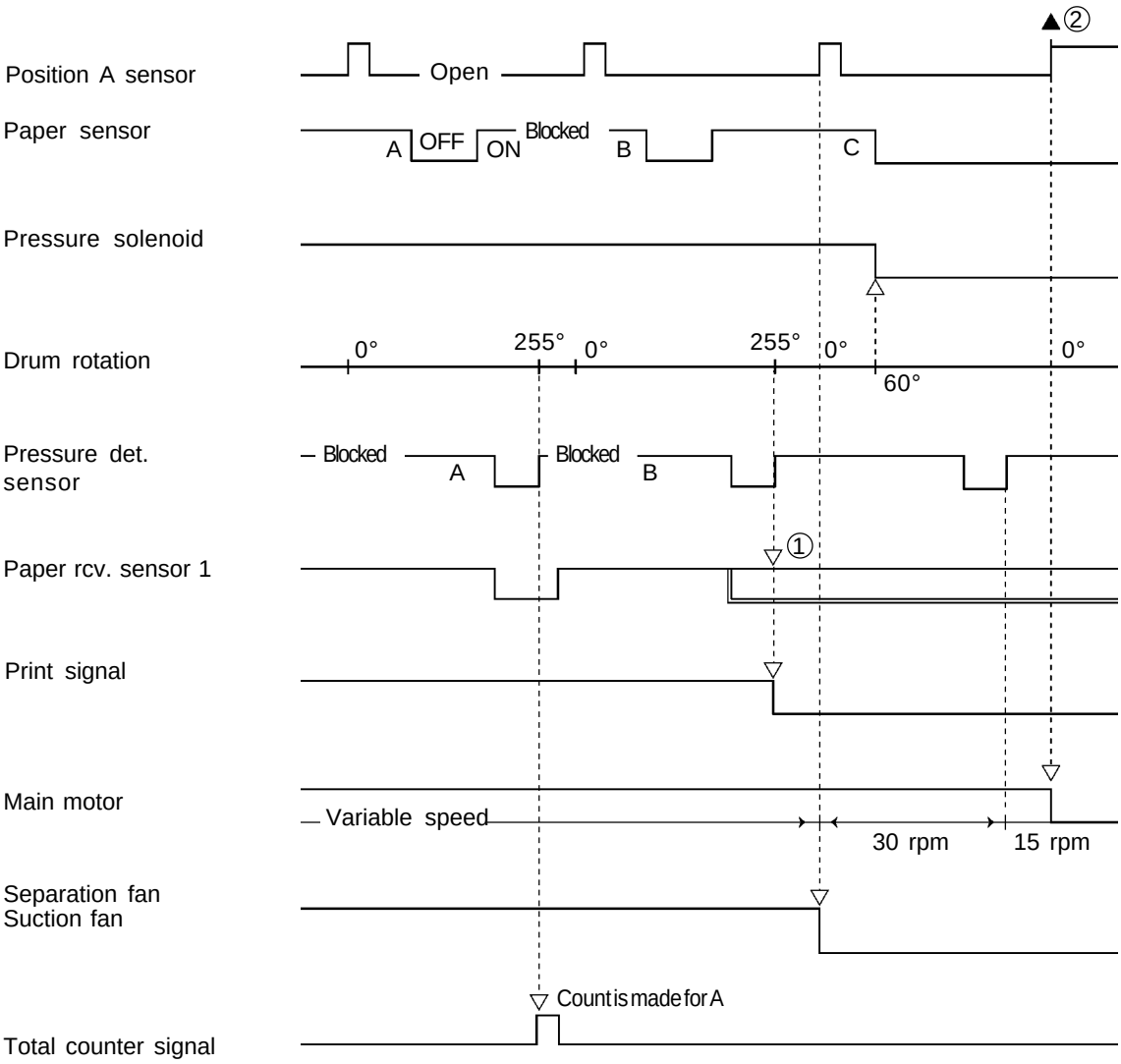


① If the Paper receiving sensor 1 detects no paper, the machine assumes that the paper has jammed, and turns the Print signal OFF.

② At the next Drum Position A, the status of the Paper sensor is checked and if the Paper sensor detects a paper, the machine assumes that the **paper has jammed at the Second paper feed area**, and "PAPER JAM CHECK PAPER FEED AREA" is displayed.
But if the Paper sensor detects no paper, the machine assumes the **paper has jammed under the Drum**, "PAPER JAM ON DRUM REMOVE PAPER" is displayed.

- Timing Chart -

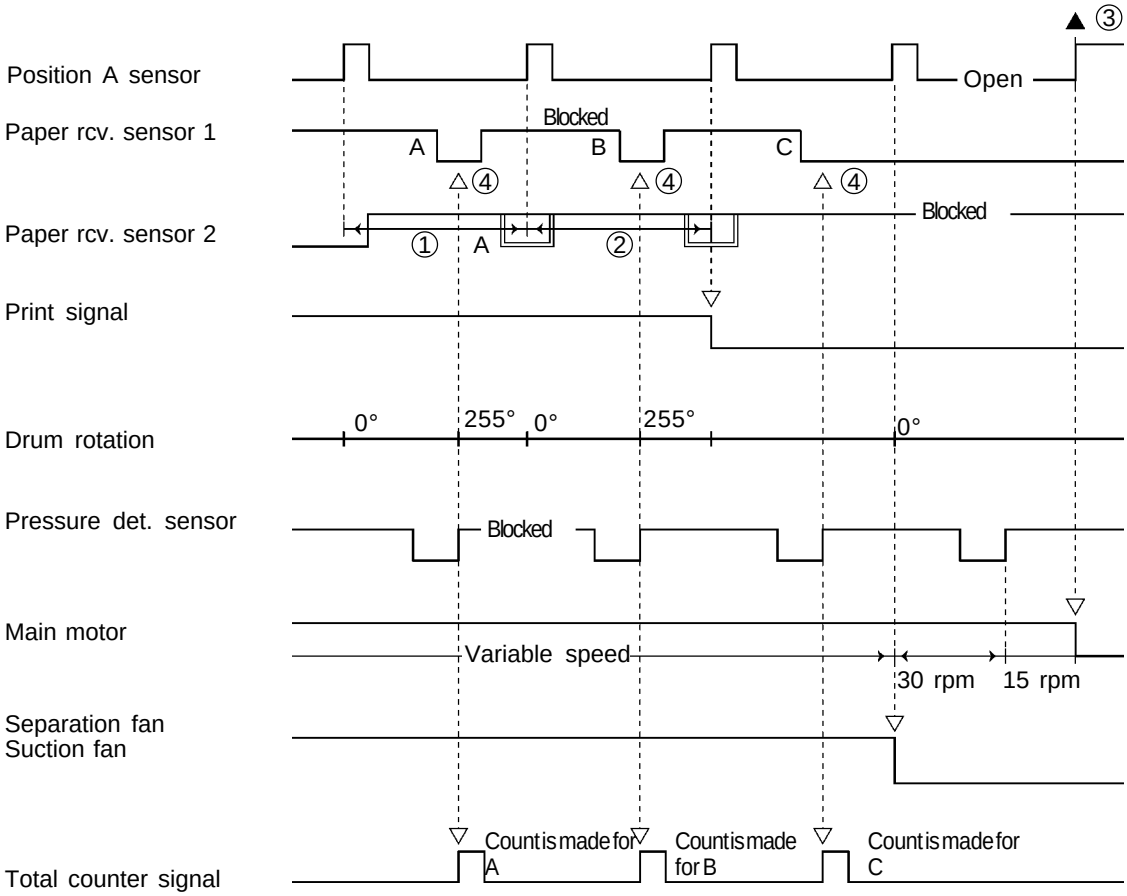
Paper Jam at Paper Receiving Sensor 1



① If the Paper receiving sensor 1 still detects a sheet of paper, the machine assumes the **paper has jammed at the Paper receiving sensor 1**, and turns the Print signal OFF.
② When the Drum stops, “PAPER JAM UNDER DRUM PULL OUT DRUM” is displayed.

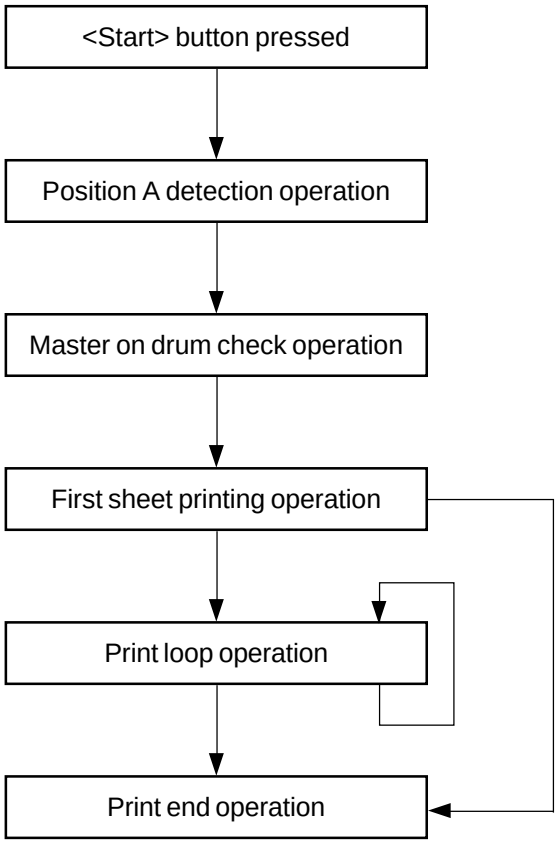
- Timing Chart -

Paper Jam at Paper Receiving Sensor 2



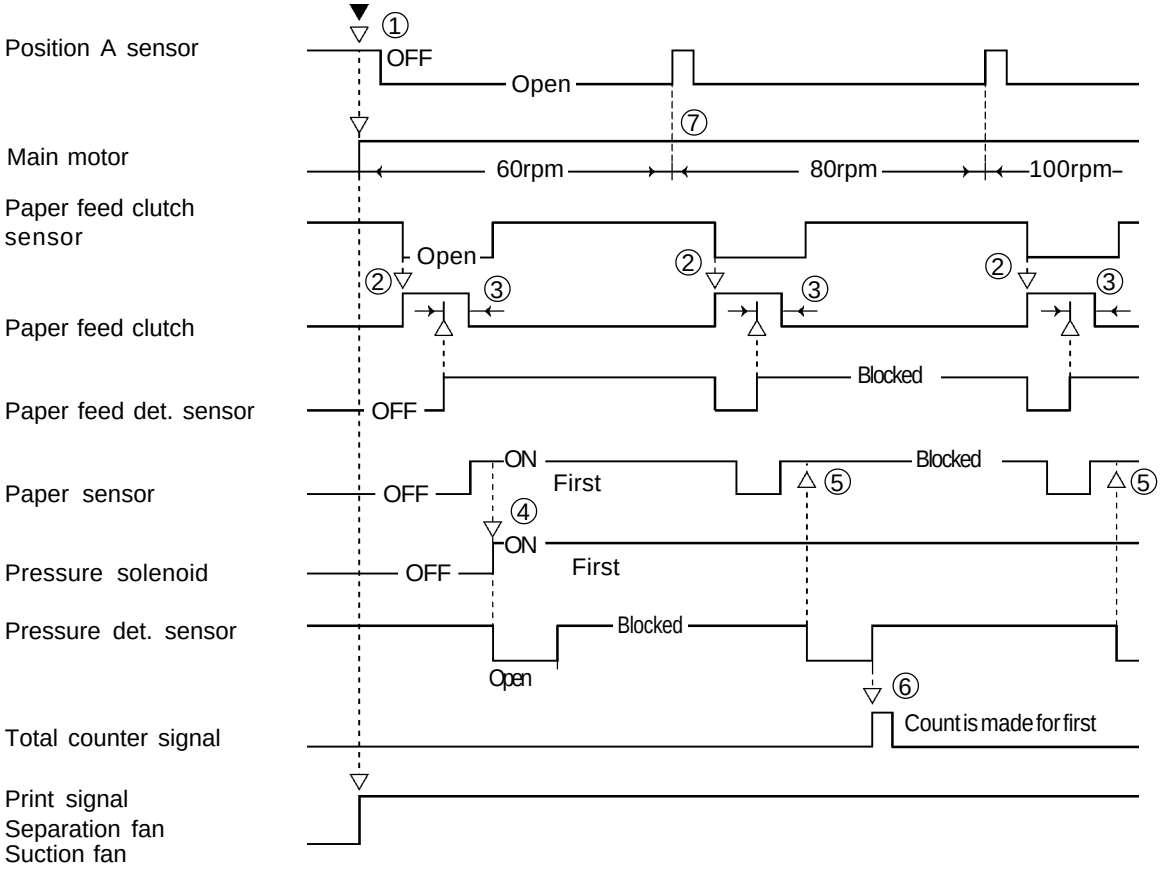
① Between the respective Drum Positions A, it is checked if the light path of the Paper receiving sensor 2 is opened.
② If the Paper receiving sensor 2 keeps detecting a sheet of paper while the Drum Position A is checked twice, the machine assumes the paper has jammed at the Paper receiving sensor 2, and turns the Print signal OFF.
③ When the Drum stops, “PAPER JAM UNDER DRUM PULL OUT DRUM” is displayed.
④ A sheet is assumed to be printed each time the status of the light path of the Paper receiving sensor 1 changes from "Blocked" to "Open" after it is confirmed that of the Paper sensor changed from "Blocked" to "Open".
Then as the light path of the Pressure detection sensor is blocked, the Total counter signal is turned ON to add one count on the Total counter.

2. Flow of Printing Operations



- Timing Chart -

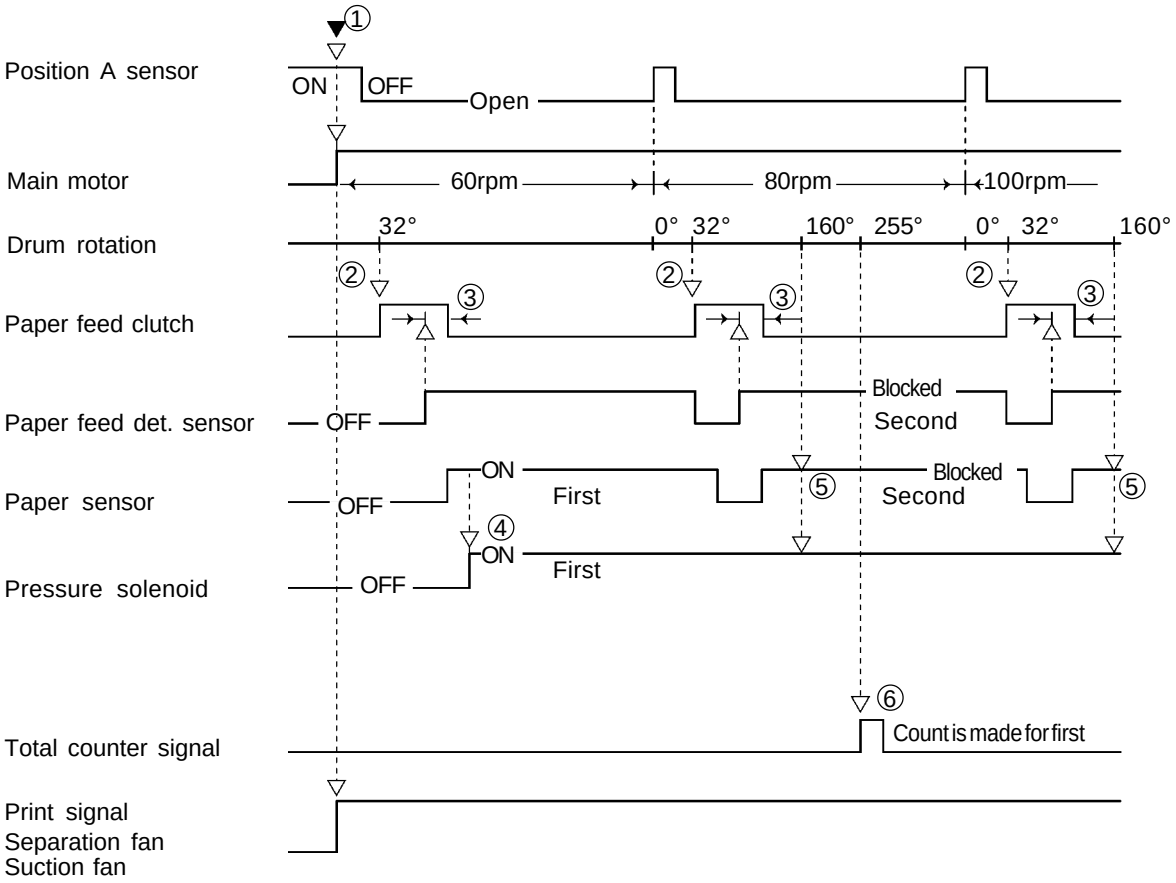
Printing Start Timing Chart (P disc, Pressure sensor disc)



① If the Position A sensor does not detect the Position A plate when the START button is pressed, the Drum rotates until the sensor detects the Position A plate.
If the presence of the master on the Drum is not checked when the START button is pressed, the Drum rotate and the Master loading sensor checks the presence at the Position C-1.
If the Upper limit sensor does not pressed when the START button is pressed, the Elevator motor lifts the Paper feed tray until the Upper limit sensor is pressed.
② If the light path of the Paper feed clutch sensor is opened while the Print signal is ON, the Paper feed clutch is engaged.
③ After the Paper feed detection sensor detects the leading edge of a sheet, the Paper feed clutch is disengaged.
④ The Pressure solenoid is activated ON when light path of the Paper sensor is blocked.
⑤ The moment the light path of the Pressure detection sensor senses the light, the Pressure solenoid is turned on consecutively when the light path of the Paper sensor is blocked.
⑥ The Total counter advances one count when the light path of Pressure detection sensor is blocked after the paper passed the Paper receiving sensor 1.
⑦ The Print speed is changed when the Position A sensor detect the Position A plate.

- Timing Chart -

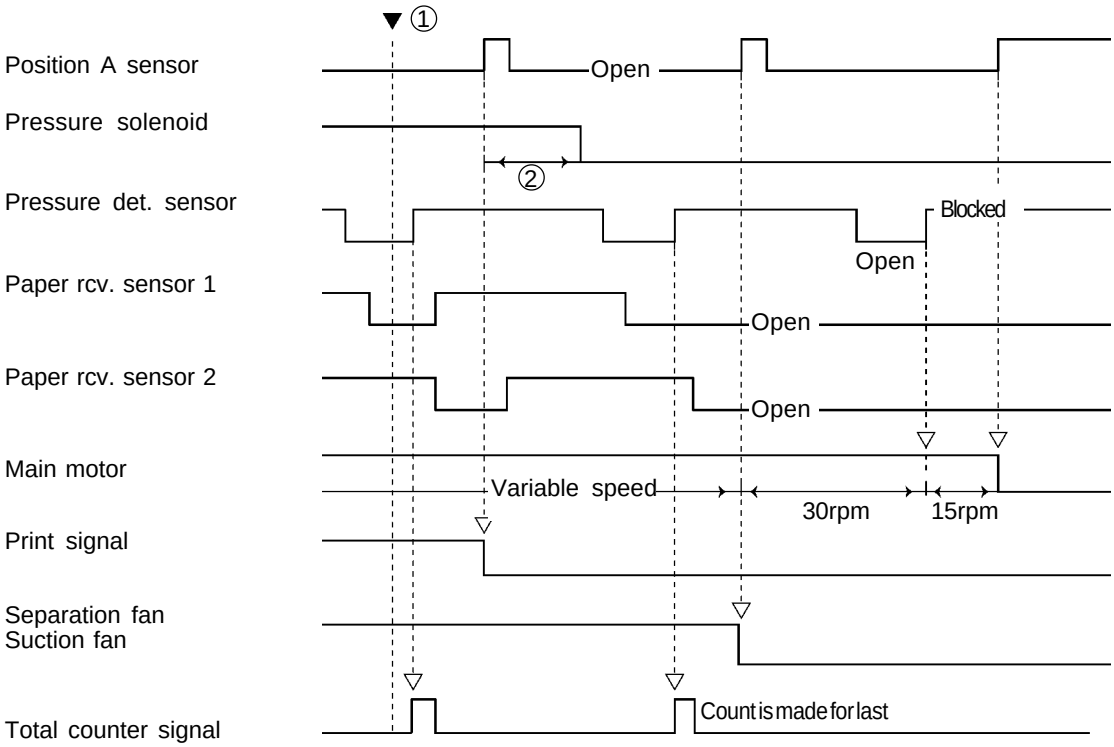
Printing Start Timing Chart (Drum angle)



① If the Position A sensor does not detect the Position A plate when the START button is pressed, the Drum rotates until the sensor detects the Position A plate.
If the presence of the master on the Drum is not checked when the START button is pressed, the Drum rotate and the Master loading sensor checks the presence at the Position C-1.
If the Upper limit sensor does not pressed when the START button is pressed, the Elevator motor lifts the Paper feed tray until the Upper limit sensor is pressed.
② The Paper feed clutch is engaged when the Drum rotates 32°.
③ After the Paper feed detection sensor detects the leading edge of a sheet, the Paper feed clutch is disengaged.
④ The Pressure solenoid is activated ON when light path of the Paper sensor is blocked.
⑤ The moment the Drum rotates 160°, the Pressure solenoid is turned on consecutively when the light path of the Paper sensor is blocked.
⑥ The Total counter advances one count when the Drum rotates 255° after the paper passed the Paper receiving sensor 1.
⑦ The Print speed is changed when the Position A sensor detect the Position A plate.

- Timing Chart -

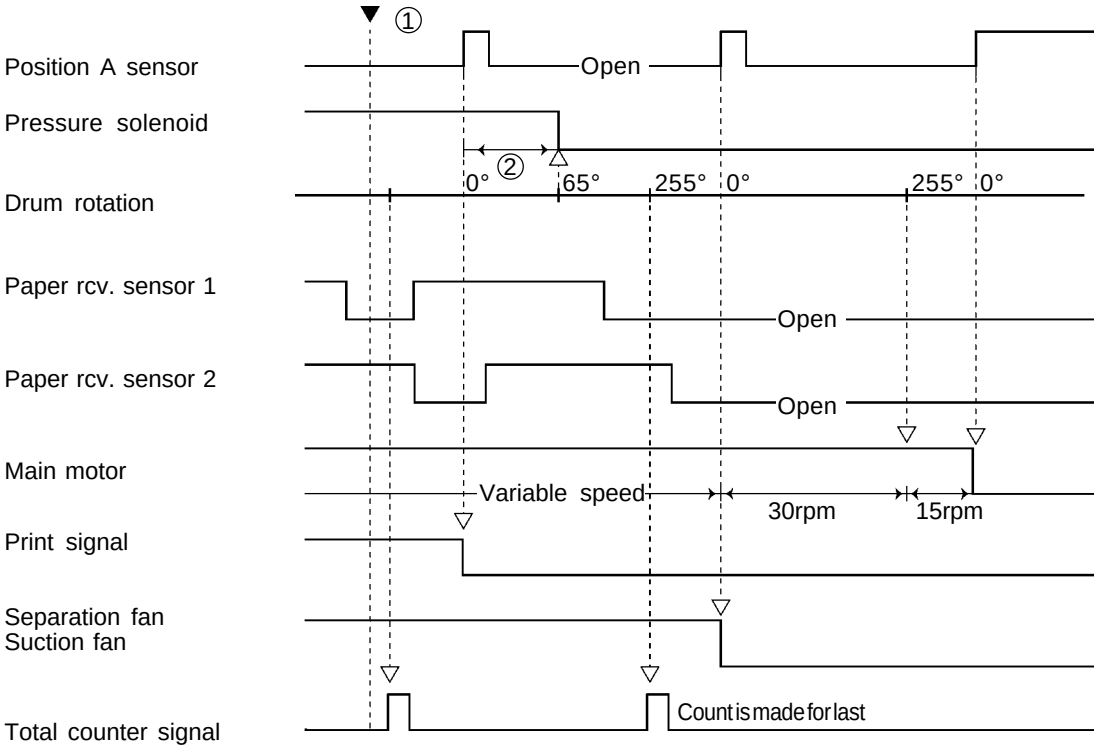
Printing Stop Timing Chart (P disc, Pressure sensor disc)



① If the STOP key is pressed before the Pressure detection sensor is blocked, the print stop movement starts.
If the STOP key is pressed just after the Pressure detection sensor is blocked, the Drum rotates one turn until the next Drum position A before the print stop movement starts.
② The Pressure solenoid is deactivated when the Drum rotates 65°.

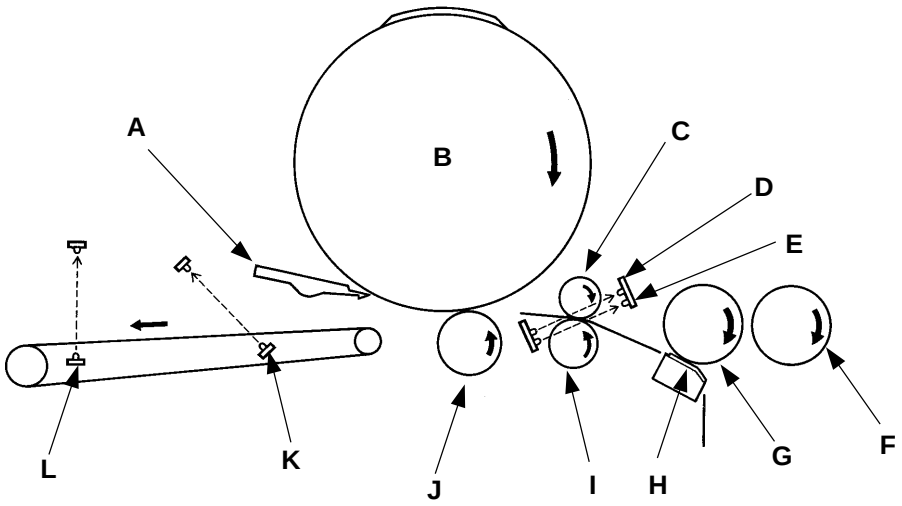
- Timing Chart -

Printing Stop Timing Chart (Drum angle)



① If the STOP key is pressed before the Drum rotates 255°, the print stop movement starts.
If the STOP key is pressed just after the Drum rotates 255°, the Drum rotates one turn until the next Drum position A before the print stop movement starts.
② The Pressure solenoid is deactivated when the Drum rotates 65°.

3. Cross Sectional Diagram of Paper Feed & Receive



A: Separator
B: Drum
C: Guide roller
D: Paper sensor
E: Paper feed det. sensor
F: Scraper roller
G: Pickup roller
H: Stripper pad
I: Timing roller
J: Pressure roller
K: Paper receiving sensor 1
L: Paper receiving sensoe 2

CHAPTER 10: MASTER CLAMP SECTION

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2. Clamp Motor 10R-2
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LED DRM1 180 Angular sensor
– Light up when magnetism is detected

THEORY OF OPERATION

1. Clamp Plate Opening System

- Opening of Clamp Plate

If the Position A sensor detects the Position A plate (if it is confirmed that the Drum is at the home position), at the same time, the Clamp solenoid is activated and the Clamp unit is pulled down, releasing the actuator of the Clamp safety switch (, which is pressed by the Clamp unit when the Clamp solenoid is not energized).

100 ms later, the Clamp motor starts rotating and opens the Clamp plate via gear engagement.

- Check of Opened Clamp Plate

When the 180° Angular sensor detects the Angular magnet on the Angular magnet plate, which is attached to one end of the Clamp plate shaft, the Clamp motor and Clamp solenoid are deactivated.

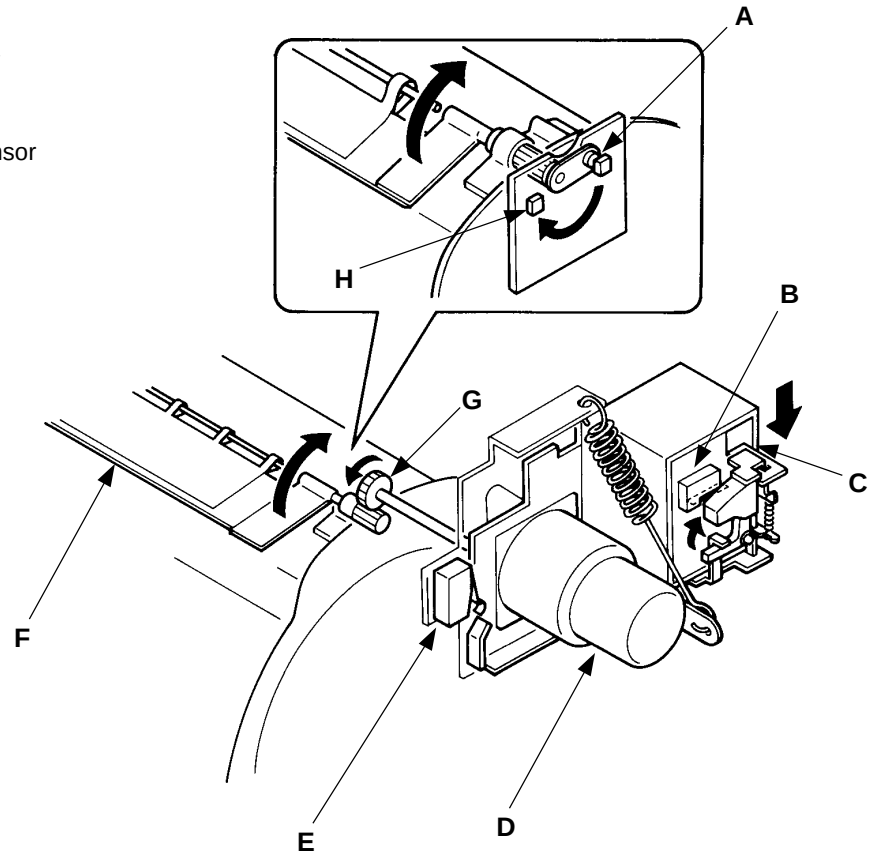
- Finish of Clamp Plate Operation

When the Clamp solenoid is deactivated, the Clamp unit is returned to the initial (retreat) position and presses the actuator of the Clamp safety switch, by which it is confirmed that the operation of opening the Clamp plate is finished.

- Protection of Clamp Solenoid

When the Clamp solenoid is energized, the Range setting switch is actuated ON to reduce the current flowing through the solenoid for protecting it against overheat.

A: Angular magnet
B: Range setting SW
C: Clamp solenoid
D: Clamp motor
E: Clamp safety SW
F: Clamp plate
G: Gear
H: 180° Angular sensor

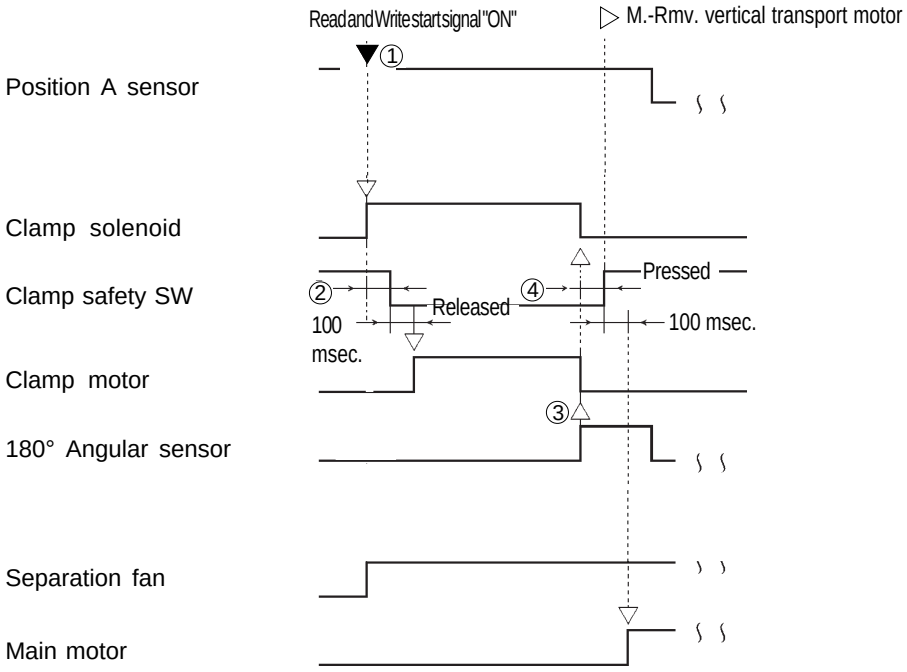


THEORY OF OPERATION

Test Mode No.10 180° Angular sensort
– Short interval beeps when magnetism is detected
No.70 Master removal fan
No.73 Clamp solenoid
No.104 Clamp opening/closing

- Timing Chart -

Clamp Plate Opening System



① If the Position A sensor does not detect the Position A plate before the Clamp plate opening operation starts, the Drum rotates until the sensor detects the Position A plate.

② If the Clamp safety switch has not been released OFF **within 4 seconds** after the Clamp solenoid is energized, the Clamp solenoid is deenergized and the Drum rotates once for the Position A.
Then the Clamp solenoid is energized once again.
If the Clamp safety switch has not been released OFF **within 4 seconds** again, the machine assumes a Clamp error-1 has occurred and indicates the error message **[T 3]**.

③ If 180° Angular sensor has not detected a magnet **within 8 seconds** after the Clamp motor is activated, the Clamp motor and Clamp solenoid are deactivated and the Drum rotates once for the Position A. Then the Clamp motor and Clamp solenoid is activated once again.
If the magnet has not been detected by the 180° Angular sensor **within 8 seconds** again, the machine assumes a Clamp error-1 has occurred and indicates the error message **[T 3]**.

④ If the Clamp safety sw has not been pressed **within 4 seconds** after the Clamp solenoid is deenergized, the machine assumes a Clamp error-1 has occurred and displays the error message **[T 3].**

- If the Clamp Safety switch is not pressed at other than clamp solenoid operation time, “T14 ” will be displayed.

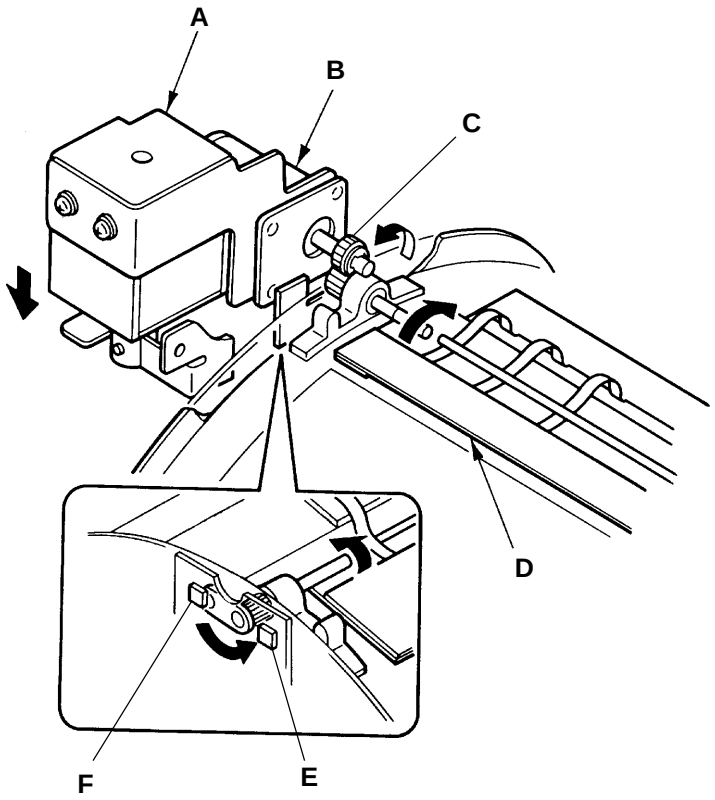
T3(Clamp Error (1))
• Clamp safety switch not turned on/off • 180° Angular sensor not turned on/off

T14(Clamp Error (2))
• Clamp safety switch not pressed at normal time

LED DRM0 0° Angular sensor
– Short interval beeps when magnetism is detected

2. Clamp Plate Closing System

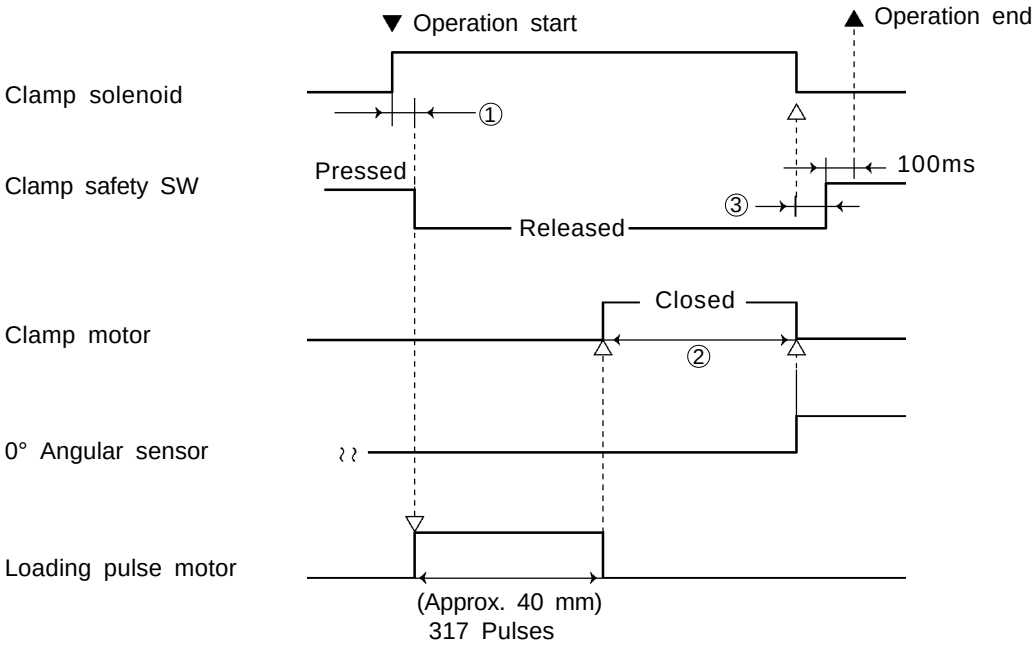
If the Drum comes back to the Position A in master removal vertical transport operation, the Clamp solenoid will be turned on and the Clamp unit will go down.
If it is confirmed that the Clamp safety switch has been released and the unit has moved down, the Loading pulse motor will be turned on to feed out the master over the drum.
Then, the Clamp motor will be turned on and start closing the clamp plate. If the 0° Angular sensor detects a magnet, the Clamp motor and clamp solenoid will be turned off. Once it is confirmed that the Clamp safety switch has been pressed and the Clamp unit has moved back upward, clamp plate closing operation will be completed(the Clamp Safety switch is normally pressed).



A: Clamp Solenoid
B: Clamp Motor
C: Gear
D: Clamp Plate
E: 0° Angular
F: Angular magnet

THEORY OF OPERATION

Test Mode No.9 0°Auguler sensor
– Short interval beeps when magnetism is detected
No.13 Clamp safety SW
– Short interval beeps when pressed
No.73 Clamp solenoid
No.104 Clamp opening/closing



① If the Clamp safety switch has not been released OFF within 4 seconds after the Clamp solenoid is energized, the Clamp solenoid is de-energized and Drum rotates once for the Position A.
Then the Clamp solenoid is energized once again.
If the Clamp safety switch has not been released OFF within 4 seconds again, the machine assumes a Clamp error-1 has occrred and indicates the error message **[T 3]**.

② If 0° Angular sensor has not detected a magnet within 8 seconds after the Clamp motor is activated, the machine assumes a Clamp error-1 has occurred and indicates the error message **[T 3]**.

③ If the Clamp safety SW has not been pressed within 4 second after the Clamp solenoid is de-energized, the machine assumes a Clamp error-1 has occurred and indicates the error message **[T 3]**.

* If the Clamp safety switch is not pressed at other than clamp solenoid operation time, “T14” will be displayed.

T3(Clamp Error (1))
• Clamp safety switch not turned on/off • 0° angular sensor not turned on/off

T14(Clamp Error (2))
• Clamp safety switch not pressed at normal time

Test Mode No.13 Clamp safety switch
– Short interval beeps when pressed
No.73 Clamp solenoid
No.104 Clamp opening/closing

REMOVAL & ASSEMBLY

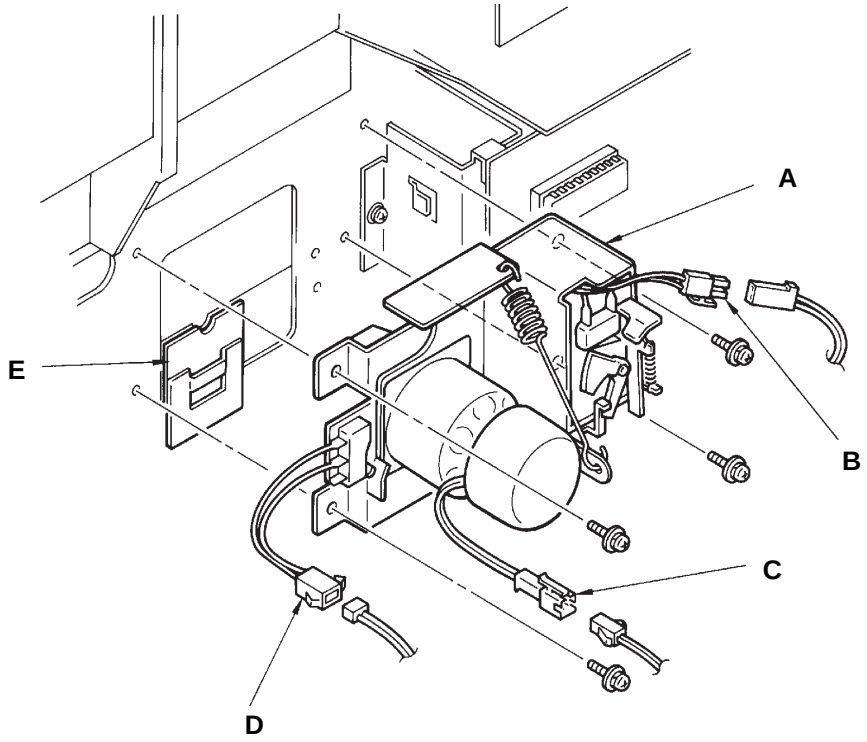
1. Clamp Unit

< Removal Procedure >

1. Turn OFF the power and remove the Back cover.
2. Disconnect the connectors of the wires coming out of the Clamp unit, i.e. Clamp solenoid, Clamp motor and Clamp safety switch.
3. Remove four mounting screws on the Clamp unit and remove the unit from the machine.

- Precautions in Assembly -

- M4x6 double-washer screws should be used in mounting the Clamp unit onto the machine. If longer screws are used, the screws will get contact with the Drum and interfere with the Drum rotation.



A: Clamp solenoid bracket
B: Clamp solenoid connector
C: Clamp motor connector
D: Clamp safety switch connector
E: Angular sensors

2. Clamp Motor

< Removal Procedure >

1. Remove the Clamp unit, referring to the previous page.
2. Remove four mounting screws of the Clamp motor and remove the motor from the Clamp unit.

- Precautions in Assembly -

- Put grease lightly on the Drive gear of the Clamp motor.
- Put locking bond on the mounting screws of the Calmp motor after attaching the motor back on the Clamp unit.

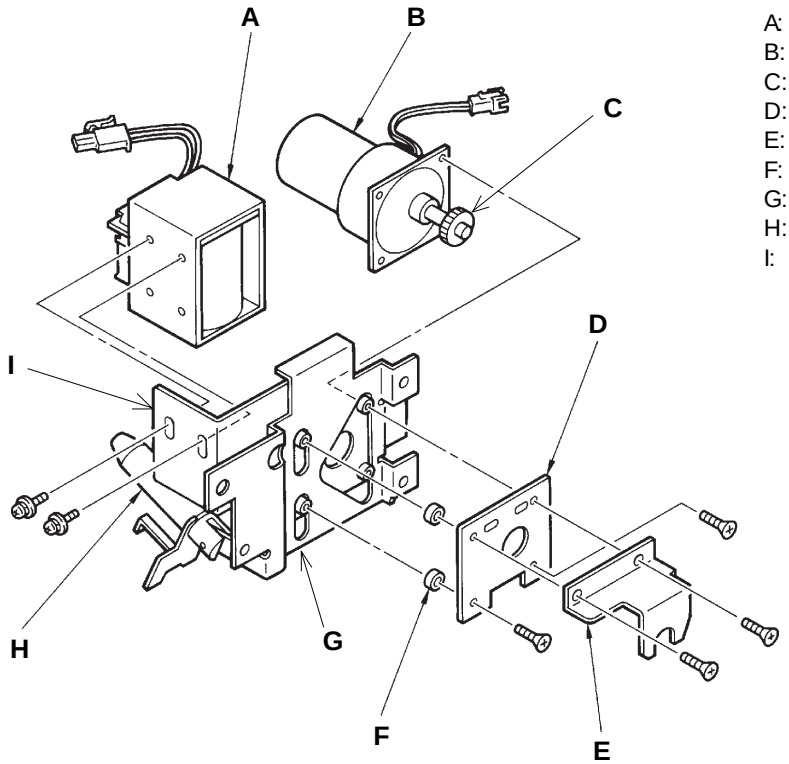
3. Clamp Solenoid

< Removal Procedure >

1. Remove the Clamp unit, referring to the previous page.
2. Remove two mounting screws of the Clamp solenoid and remove the solenoid from the Clamp unit, separating it from the Plunger.

- Precautions in Assembly -

- Put grease lightly on the sliding surface between the Clamp solenoid base plate and Clamp solenoid bracket.
- Attach the clamp solenoid to the bottom of the long holes.



A: Clamp solenoid
B: Clamp motor
C: Drive gear
D: Compensator plate bracket
E: Compensator plate
F: Compensator plate spacer
G: Clamp solenoid base plate
H: Plunger
I: Clamp solenoid bracket

CHAPTER 11: MASTER REMOVAL SECTION

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2. Clamp Plate Opening System 11T-2
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REMOVAL & ASSEMBLY

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ADJUSTMENT

1. Projected Position of Master Removal Hooks 11A-1
2. Position of Master Removal Hook Sensor 11A-2

LED DRMC Position C Sensor
– Light up when light path is blocked
CSEN Master loading sensor
– Light up when reflected light detected
Test Mode No.11 Position C sensor
– Short interval beeps when light path is blocked
No.48 Master loading sensor
– Short interval beeps when reflected light detected

THEORY OF OPERATION

1. Master Presence on Drum Check System

- Check of Master Presense on Drum

When the START button is pressed for master making, the Master loading sensor checks the presence of the master on the Drum at the Position C-1.
If the machine already knows the presence of the master on the Drum from the earlier machine operation, this master check movement is skipped.

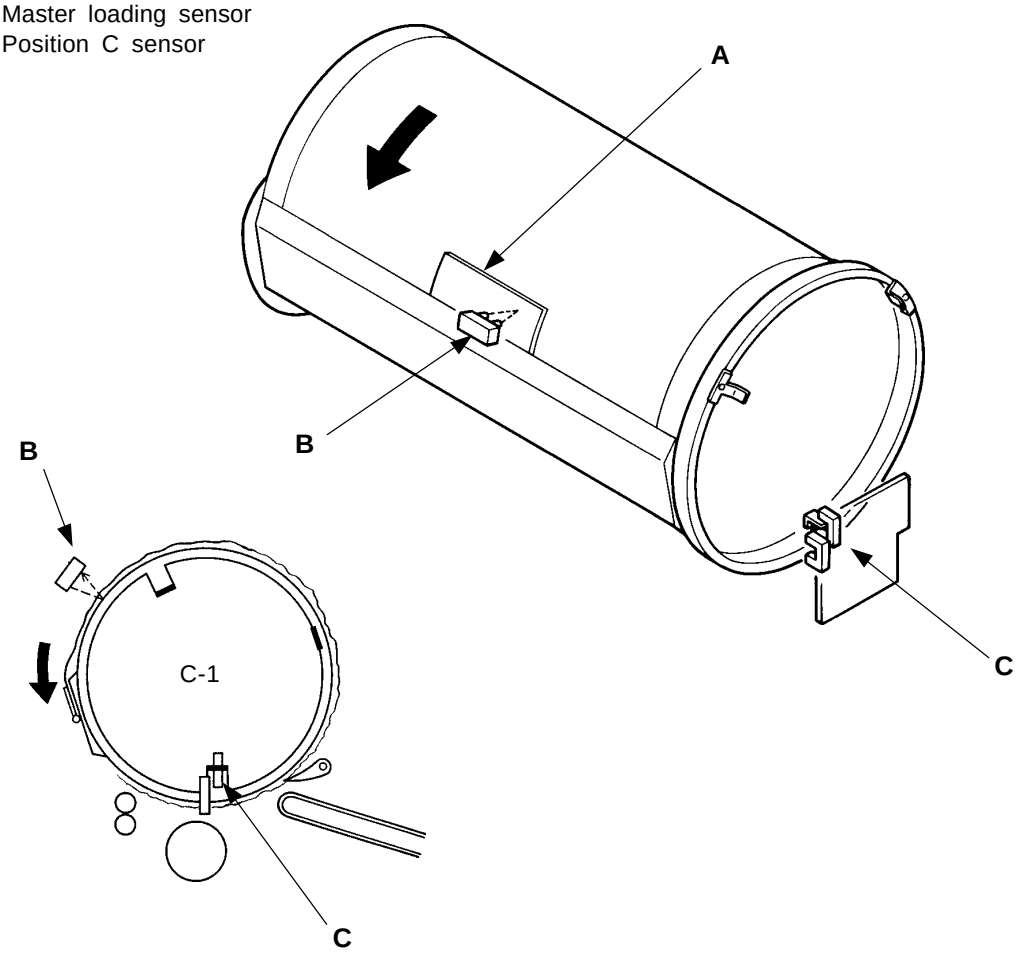
When master is detected on the Drum

The machine goes into master removal and Master removal sensor becomes active.

When master is not detected on the Drum

The machine goes into master removal but Master removal sensor does not check if the light path is blocked by the removed master.

A: Light absorber strip
B: Master loading sensor
C: Position C sensor

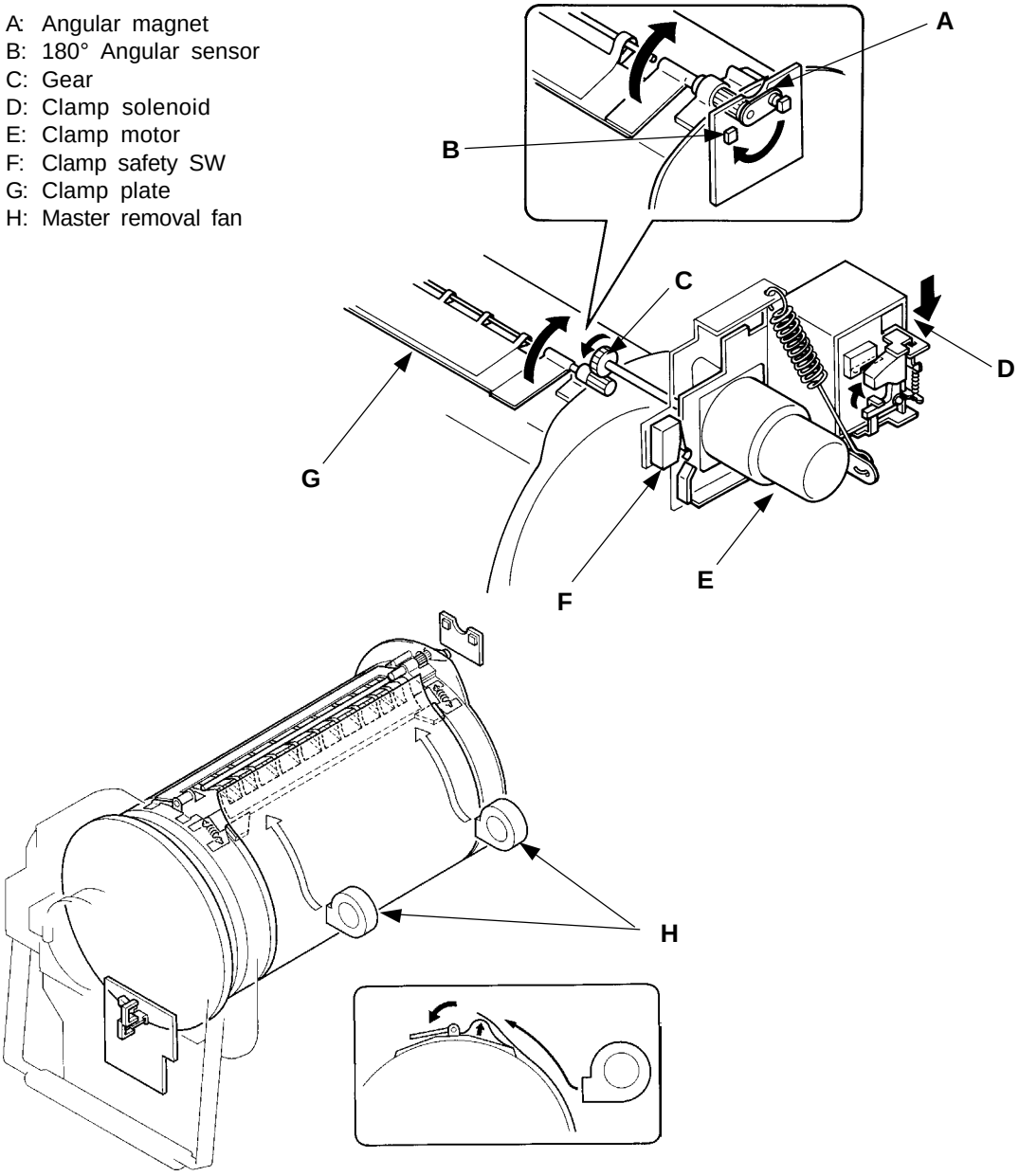


LED DRM1 180 ° Angular sensor
– Light up when magnetism is detected

2. Clamp Plate Opening System

When the START button is pressed for master making, if the Position A sensor detects the position A plate, at the same time, the Clamp solenoid is activated and the Clamp unit is pulled down, releasing the actuator of the Clamp safety switch.
The Clamp motor starts rotating and opens the Clamp plate until the 180° Angular sensor detects the Angular magnet.
The Clamp plate sheet will raise the leading edged of the master to guide the master to the Master removal unit.
This Clamp plate sheet and Master removal fan are combined to control the leading edged of removed master.

A: Angular magnet
B: 180° Angular sensor
C: Gear
D: Clamp solenoid
E: Clamp motor
F: Clamp safety SW
G: Clamp plate
H: Master removal fan



MEMO

LED MJAM Master removal sensor
– Light up when light path is blocked
TUME Master removal hook sensor
– Light up when light path is opened

3. Master Removal System

- Start of Master Removal

When the Clamp safety switch is actuated ON by the Clamp unit, the Master removal vertical transport motor and Master removal solenoid are energized.

By the rotation of the M.-Rmv. vertical transport motor, the Vertical transport roller (down) is rotated via pulleys and belt. The rotation of the vertical transport roller (down) is transmitted to the Vertical transport roller (up) by gears, rotating both rollers together.

At the same time, the Master removal hooks are projected by the turn of the Master removal hook shaft activated by the energized Master removal solenoid.

100 msec later, the Main motor starts, rotating the Drum to remove a used master.

The lead edge of the released used master is caught by the Master removal hooks and advances into between the Vertical transport rollers (up) and (down).

- Finish of Master Removal

When the Drum reaches the Position A, the Main motor is turned off to stop the Drum.

2 seconds later, the M.-Rmv. vertical transport motor and Master removal solenoid are deenergized, to finish the master removal operation.

- Assistance in Master Removal Operation

The Master removal fan operates and floats the top part of a released used master over the Drum, preventing the Master removal hooks from missing the master.

The fan is activated when the Drum comes to the Position A and deactivated at Position C-1 during the master removal.

Besides, the Master guide plate prevents the released master from curling up and clearing the hooks as well.

- Check of Passage of Removed Master

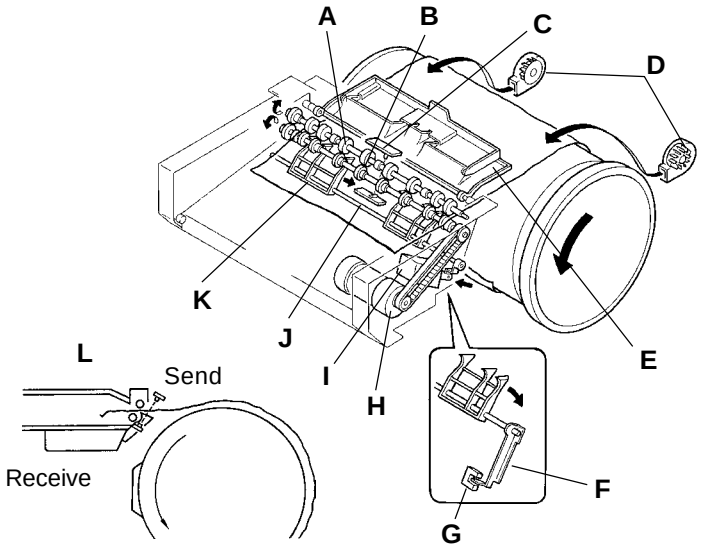
If master is detected on the Drum by the Master loading sensor, the Master removal sensor checks if the light path is blocked by the removed master while the Drum is rotated from the Position **C-1** up to **the Position A**, and if it is opened again **within 2 seconds** after the Drum returns to the Position A (the home position).

- Detection of Master Removal Jam

The Master removal hook sensor checks whether the hooks are correctly returned to their home position when the Master removal solenoid is not activated.

If the light path of the Master removal hook sensor is not blocked while the machine is in idle, it is assumed that the removed master is jammed on the Master removal hooks and the error message "**REMOVE JAMMED MASTER IN DISPOSAL UNIT**" is displayed.

The same error message is diplayed if the light path of the Master removal sensor is blocked, assuming that the removed master is jammed.



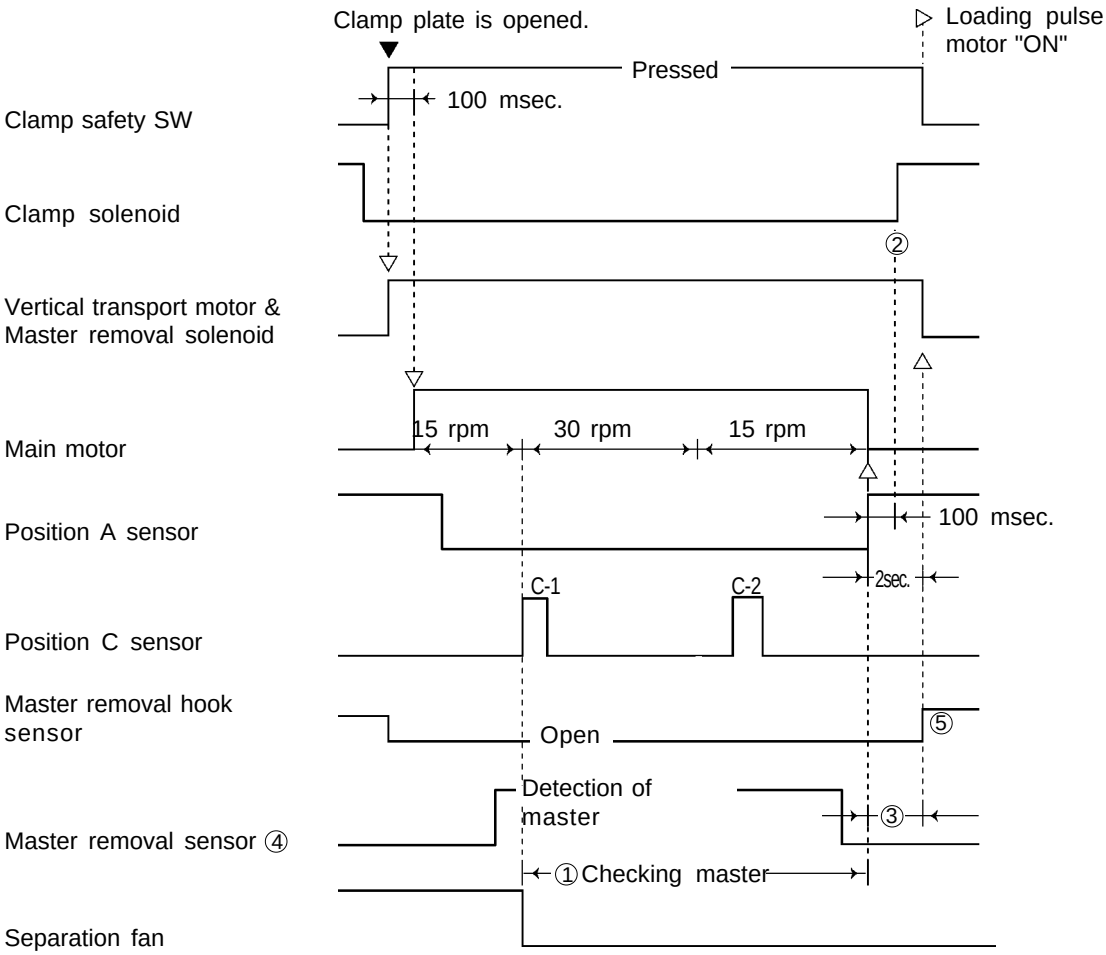
A: Vertical transport roller (up)
B: Vertical transport roller (down)
C: Master removal sensor
D: Master removal fan
E: Master guide plate
F: Hook sensor actuator
G: Master removal hook sensor
H: Master removal vertical transport motor
I: Master removal solenoid
J: Master removal hook shaft
K: Master removal hook
L: Master disposal box

THEORY OF OPERATION

Test Mode No.14 Master removal hook sensor
– Short interval beeps when light path is blocked
No.28 Master removal sensor
– Short interval beeps when light path is blocked
No.70 Master removal fan
No.71 Master removal solenoid, Master removal vertical transport motor

- Timing Chart -

Master Removal System



① If the light path of the sensor has not been blocked since the **Position C-1** by the **Position A**, the machine assumes a Master removal error has occurred and displays “DISPOSAL ERROR REMOVE DRUM AND DISCARD MASTER”.

② If the Master removal sensor still detects a removed master when the Drum stops at the position A, the Clamp solenoid will not be energized until the light path of the sensor is opened.
(The waiting time is **2 seconds** at maximum.)

③ If the Master removal sensor has not been opened **within 2 seconds** after the Drum returns to the postion A, the machine assumes a removed master blocks up the entrance into the Master disposal box and displays “DISPOSAL ERROR REMOVE DRUM AND DISCARD MASTER”.

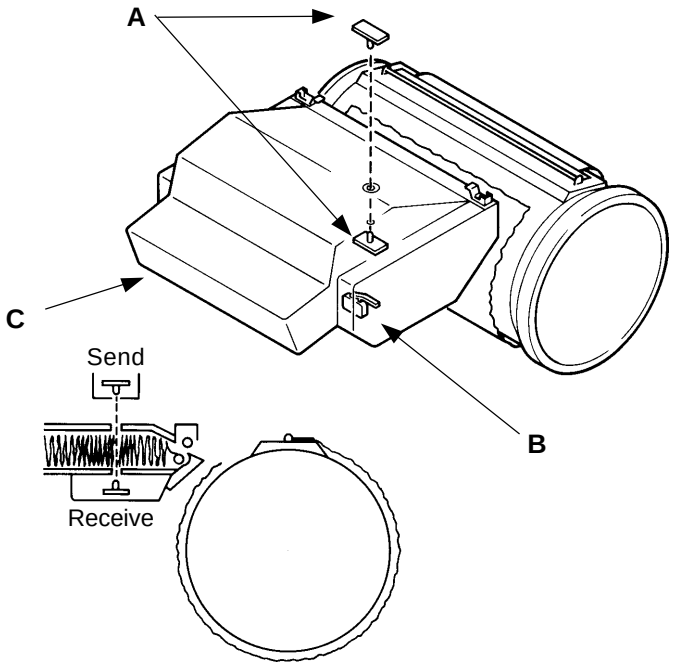
④ If the light path of the Master removal sensor is blocked in any time except master removal operation, the machine assumes that a removed master blocks up the entrance into the Master disposal box and displays “REMOVE JAMMED MASTER IN DISPOSAL UNIT”.

⑤ If the light path of the Master removal hook sensor is not blocked at machine standby time, “REMOVE JAMMED MASTER IN DISPOSAL UNIT” will be displayed.

LED HMAS Disposal box master sensor
– Light up when light path is opened
Test Mode No.33 Disposal box set SW
– Short interval beeps when pressed
No.54 Disposal box master sensor
– Short interval beeps when light path is blocked

4. Disposed Master Check System

The Master removal sensor counts the number of masters that go into the Master disposal box. The master disposal count is increased by one each time the light path of the sensor is blocked and the message indicatoin "**EMPTY DISPOSAL BOX**" is displayed when the count accumulated in the RAM memory on the System PCB reaches the set amount.
The Disposal box master sensor checks the presence of disposed masters inside the Master disposal box. The master disposal count is only reset to "0" if the Disposal box master sensor confirms no master remains in the box after the Master disposal box is pulled out to discard used masters.



A: Disposal box master sensor
B: Disposal box set SW
C: Master disposal box

- If the Disposal box set switch is not pressed, “SET MASTER DISPOSAL BOX IN PLACE” will be displayed.
- If master removal operation is repeated the set times after setting the Master disposal box, “EMPTY DISPOSAL BOX” will be displayed.

Maximum master removal count:
A3/ledger drum — 30 times A4 W drum — 42 times B4/A4/legal drum — 50 times

Test Mode(Memory Switch) No. 224 Master Removal Full Capacity Setting

Memory Switch	0	1	2	3
Full capacity (B4/A4/legal)	50	40	30	20
Full capacity (A3/ledger)	30	20	10	30
Full capacity (A4 W)	42	28	14	42

REMOVAL & ASSEMBLY

1. Master Removal Unit

< Removal Procedure >

1. Turn OFF the power and open the Scanner table.
2. Loosen the screw on the Damper shaft lock plate and slide the plate and release the shaft.
3. Lift the scanner table further to lock it.
4. Remove the mounting screws on the Damper bottom bracket lock plates and remove the brackets.
5. Hook the Dampers on the frame at the bottom of the Scanner table.
6. Remove the Master removal unit, referring to the next page.

- Precautions in Assembly -

- Make sure to secure the Damper bottom bracket lock plates firmly on the brackets.

A: Damper shaft lock plate
B: Damper
C: Damper bottom bracket lock
D: Pan-head Screw SW.W M3x5

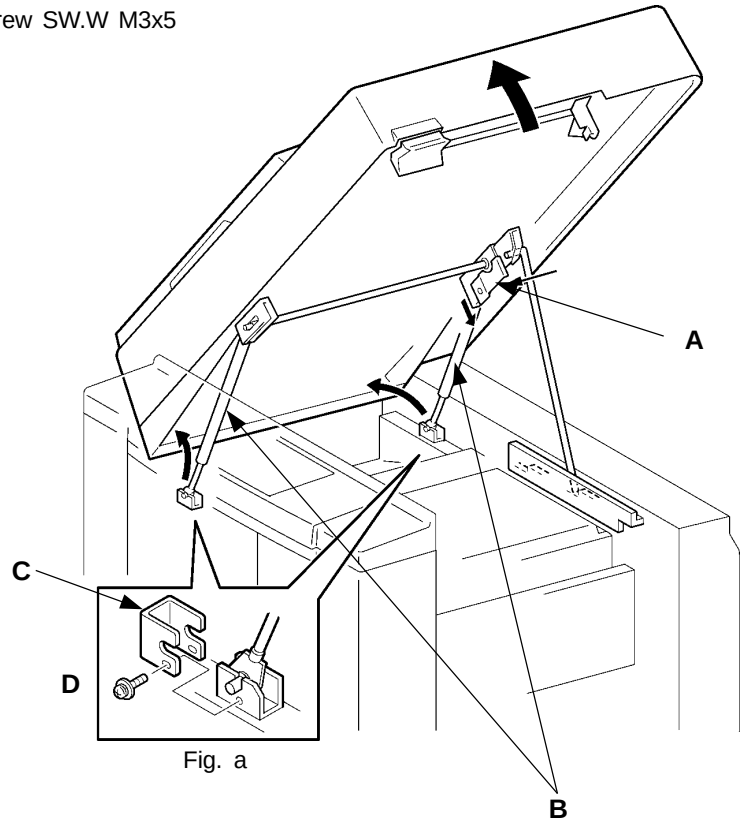


Fig. a

REMOVAL & ASSEMBLY

Test mode No.14 Master removal hook sensor
– Short interval beeps when light path is blocked
No.28 Master removal sensor
– Short interval beeps when light path is blocked
No.33 Disposal box set SW
– Short interval beeps when pressed
No.54 Disposal box master sensor
– Short interval beeps when light path is blocked
No.71 Master removal solenoid, Master removal vertical transport motor

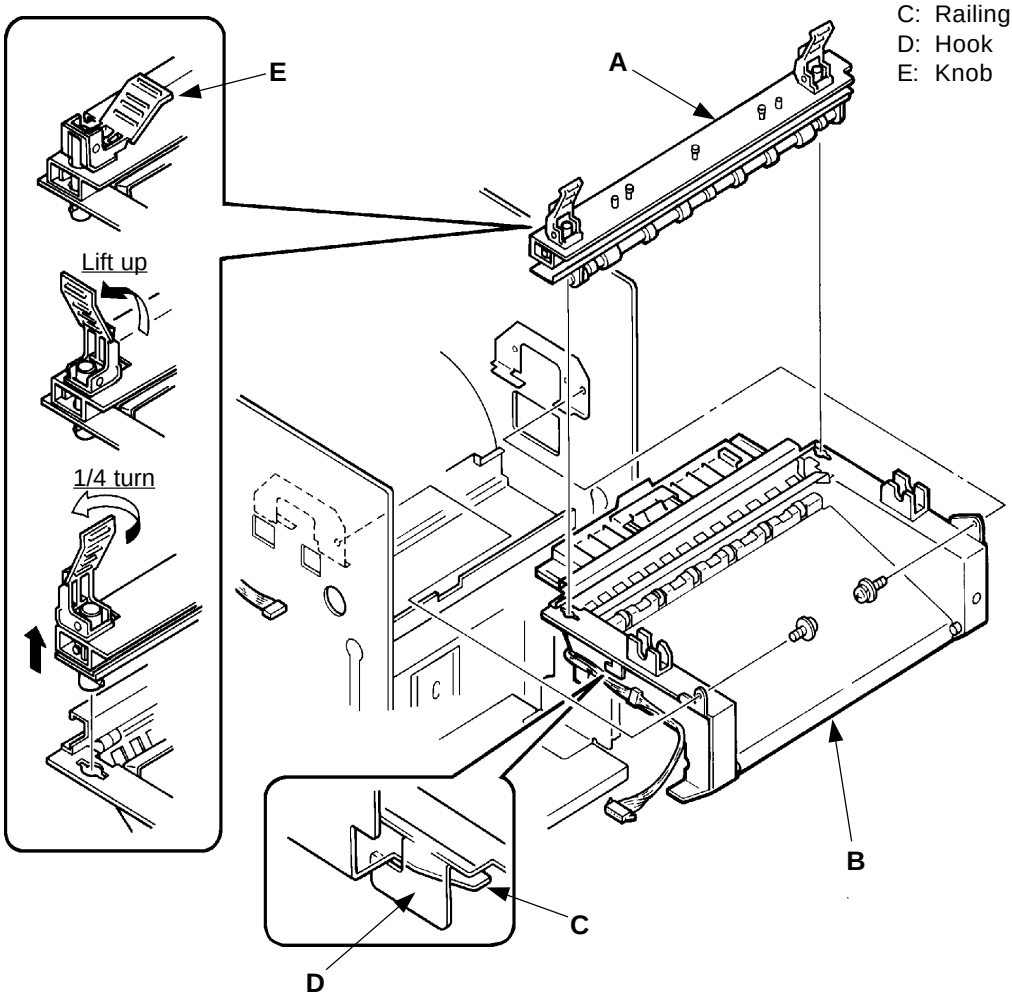
< Removal Procedure >

7. Pull out the Master disposal box from the machine and remove the Paper feed cover.
8. Remove the Back cover and disconnect the wire harness connector of the Master removal unit.
9. Remove two mounting screws on the Master removal unit.
   [Note]
   If required, lift and make a quarter turn on the two Knobs on the Vertical transport roller holder ass'y to free the ass'y from the Master removal unit.
10. Pull the unit towards the paper feed side to unlock the hooks at the bottom of the unit.
    Tip the unit toward you and take it out towards the paper feed side.

- Precautions in Assembly -

- Mount the Master removal unit so that the Master removal guide will be placed on the cutter unit.
- Make sure to lock the hooks at the bottom of the unit on the railings of the side frames.

A: Vertical transport roller holder ass'y
B: Master removal unit
C: Railing
D: Hook
E: Knob



Confirm a firm fit in assembly.

2. Master Removal Solenoid, Master Removal Hook & Vertical Transport Roller (Down)

< Removal Procedure >

Master Removal Solenoid

1) Turn off the power and remove the Master removal unit(see the previous page).
2) Remove the mounting screw of the Master removal solenoid, disconnect the solenoid's connector, and remove the assembly.

- Precautions in Assembly -

- Attach the Master removal solenoid in the center of the long hole of the unit frame.
- Check a projection amount of the Master removal hook after assembly.

Master Removal Hook

3) Remove the Spring B.
4) Remove the mounting screw of the Hook sensor actuator and remove it.
5) Remove the E-rings on the both sides of the Master removal hook shaft, and remove the shaft with the Master removal hooks attached.

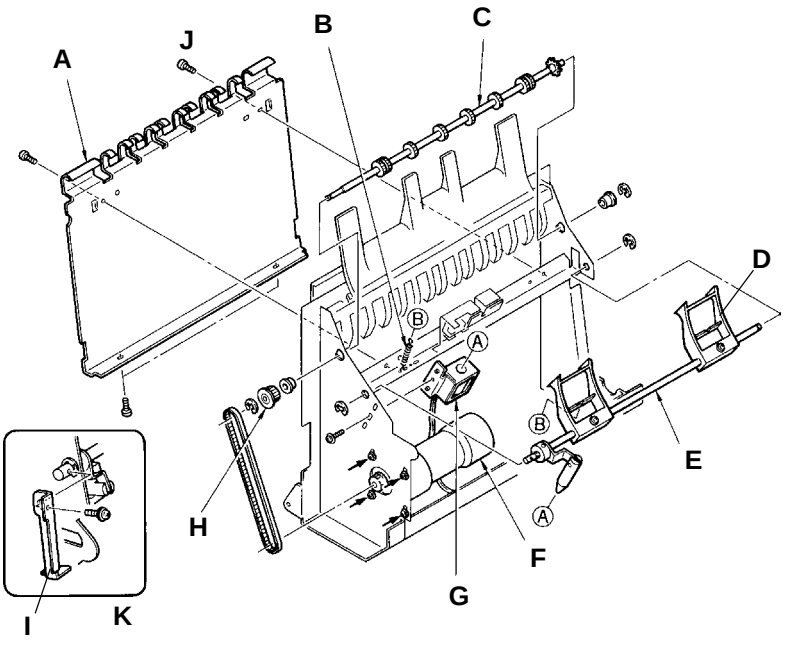
Vertical Transport Roller (Down)

4) Loosen four mounting screws of the M.-Rmv. vertical transport motor and remove the belt from the M.-Rmv. pulley B.
5) Remove E rings at both ends of the Vertical transport roller(down), and remove the M.-Rmv. pulley B and metal bearings.
6) Remove four mounting screws on the M.-Rmv. base plate and unhook the plate from the shaft of the Vertical transport roller (down).
7) Holding down the plunger of the Master removal hooks to set the hooks off the Vertical transport roller (down), move the roller sideways to remove it.

- Precautions in the Assembly -

- Comfirm that the M.-Rmv. pulley B is attached to the shaft in the right direction (the collared side should face outward) because an one-way clutch is built in the pulley.
- Make sure to match the positioning holes on the top face of the M.-Rmv. base plate with the bosses on the Master removal unit frame when securing the plate.
- Make sure to apply good tension to the belt when securing the M.-Rmv. vertical transport motor.

A: Master removal base plate
B: Spring B
C: Vertical transport roller (Down)
D: Master removal hook
E: Master removal hook shaft
F: Master removal vertical transport motor
G: Master removal solenoid
H: Master removal pulley B
I: Hook sensor actuator
J: Bind-head Screw M3x6
K: Pan-head IT Screw



Test Mode No.14 Master removal hook sensor
– Short interval beeps when light path is blocked
No.28 Master removal sensor
– Short interval beeps when light path is blocked
No.48 Master loading sensor
– Short interval beeps when reflected light detected
No.54 Disposal box master sensor
– Short interval beeps when light path is blocked

3. Master Removal Sensor, Master Loading Sensor, Master Removal Hook Sensor & Disposal Box Master Sensor

< Removal Procedure >

Master Removal Sensor

1. Remove the Master removal unit.
2. Remove two mounting screws on the M.-Rmv. upper stay and set aside the upper stay.
3. Remove the mounting screw on the Master removal sensor (send), cut the wire clamper securing the wire of the sensor to the M.-Rmv. upper stay and remove the sensor from the upper stay.
4. Remove two mounting screws on the M.-Rmv. sensor bracket and set aside the bracket.
5. Remove the mounting screw on the Master removal sensor (receive), and remove the sensor from the bracket.
6. Disconnect the connector of the Master removal sensor and cut the wire clampers securing the wires of the sensors to the Master removal unit frame.

- Precaution in Assembly -

- The Master removal sensor (send) is the one with a VR attached.

Master Loading Sensor

2. Remove the mounting screw of the Master loading sensor and disconnect the connector to remove.

Master Removal Hook Sensor

2. Remove the mounting screw of the Master removal hook sensor and disconnect its connector to remove the sensor assembly.

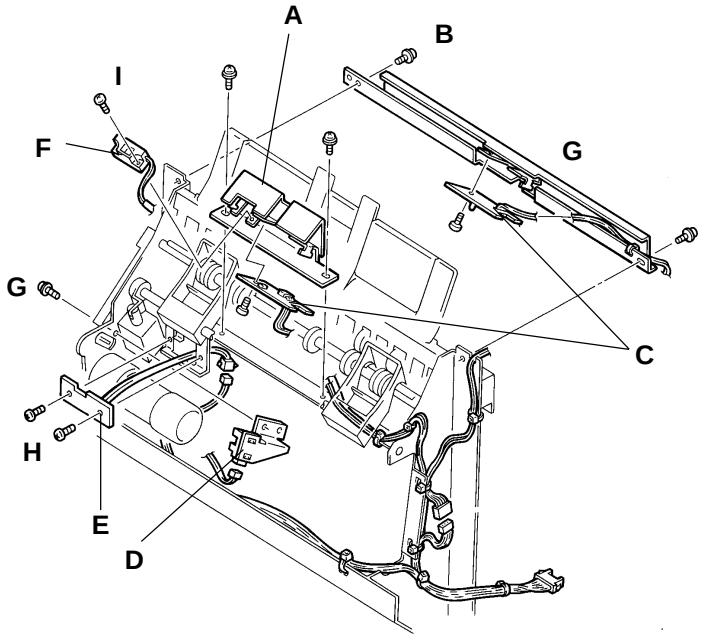
- Precaution for Mounting -

- If the Master removal hook is at the home position(withdrawn), mount to the position where the sensor is surely blocked.

Disposal Box Master Sensor(Rcv.)

2. Remove two mounting screws of the Disposal box master sensor and disconnect its connector to remove the sensor.

A: Master removal sensor bracket
B: Master removal upper stay
C: Master removal sensor
D: Master removal hook sensor
E: Disposal box master sensor
F: Master loading sensor
G: Pan-head IT Screw M3x5
H: Bind-head Screw M3x6
I: Bind-head Screw M3x8



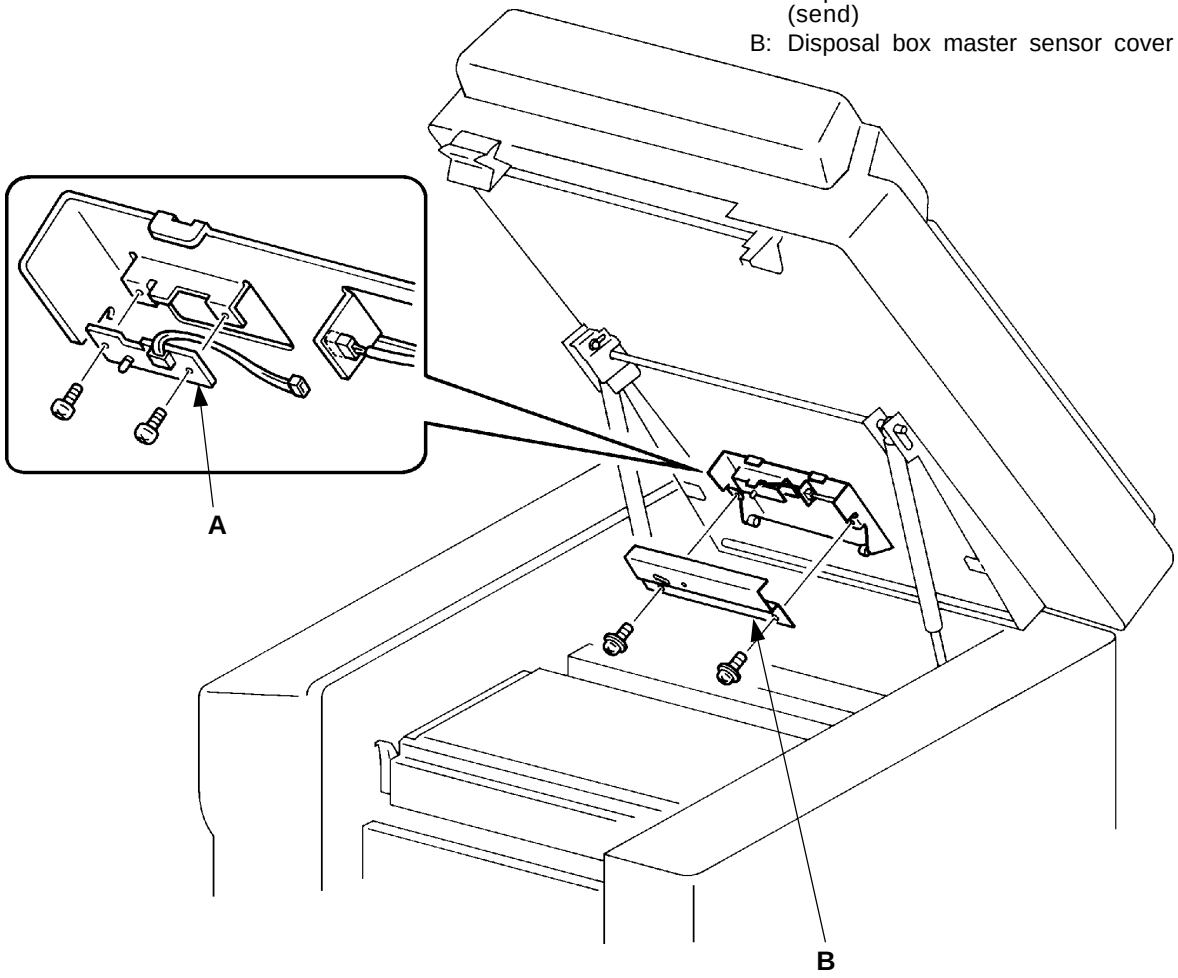
LED HMAS Disposal box master sensor
– Light up when light path is opened
Test Mode No.54 Disposal box master sensor
– Short interval beeps when light path is blocked

4. Disposal Box Master Sensor (Send)

< Removal Procedure >

1. Turn OFF the power, open the Scanner table and remove the Master disposal box.
2. Remove two mounting screws on the Disposal box master sensor cover and remove the cover.
3. Remove two mounting screws on the Disposal box master sensor (send), disconnect the connector and remove the sensor.

A: Disposal box master sensor (send)
B: Disposal box master sensor cover

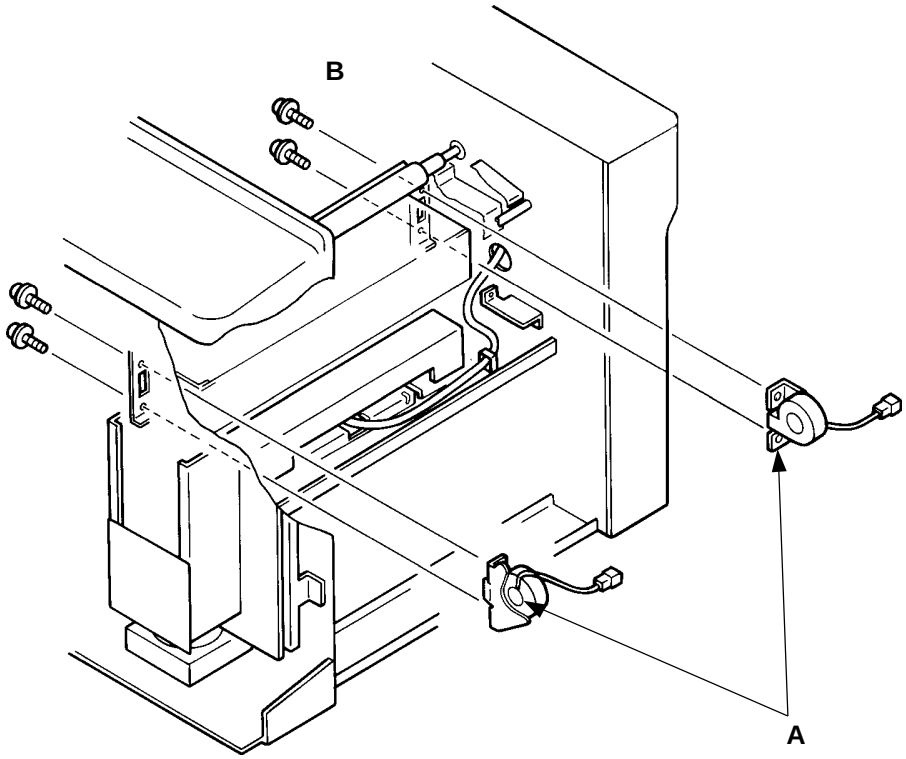


5. Master Removal Fan

< Removal Procedure >

1. Remove the Master roller holder unit.
2. Remove two mounting screws of the Aero guide sheet and remove the sheet.
3. Remove two mounting screws of the Master removal fan, disconnect the connector and remove the fan.

A: Master removal fan
B: Pan-head Screw SW.W M4x8



ADJUSTMENT

1. Projected Position of Master Removal Hooks

1. Pull out the Drum, open the Clamp plate and return the Drum into the machine.
2. Rotate the drum until the edge of the opened Clamp plate is positioned just below the tips of the Master removal hooks.
2. Start up Test mode **No.71** to project the Master removal hooks.
3. Check the tip of the projected Master removal hooks is **2 ~ 3mm** off the Clamp plate on the Drum.
4. If not, return the Drum to the home position.
5. Turn off the power and remove the Master removal unit.
6. Attach the Vertical transport roller holder ass'y and loosen the allen screw of the Linking plate.
7. Pressing the plunger of the Master removal solenoid, turn the Master removal hooks until the tip of the hook is **17~18mm** off the shaft of the Vertical transport roller (up).
   Holding the Master removal hooks in this position, tighten the allen screw on the Linking plate without releasing the plunger of the Master removal solenoid.
8. Re-check the projected position of the Master removal hooks with Test mode No.71.

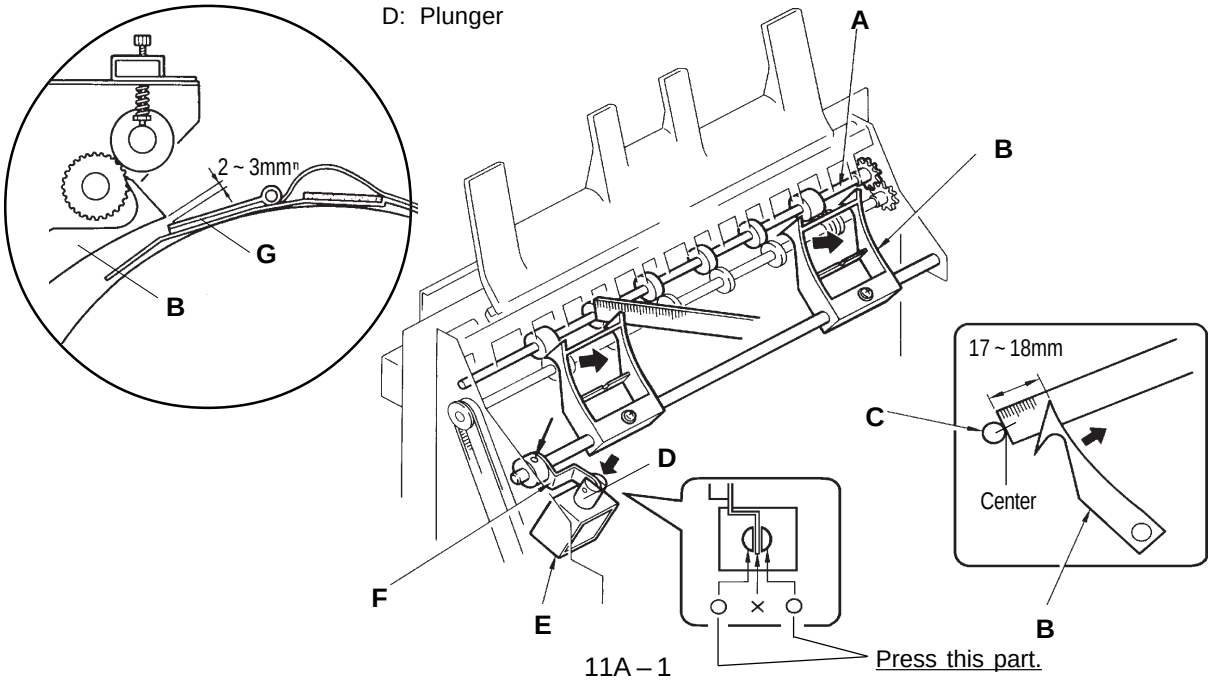
- Precautions in Adjustment -

- When adjusting the projected position of the Master removal hooks, make sure to press the plunger not the Linking plate.

- Results of Misadjustment -

- If the Master removal hooks are not projected enough;
  a used master will not be removed from the drum and the error massage "DISPOSAL ERROR REMOVE DRUM AND DISCARD MASTER" is displayed.
- If the Master removal hooks are projected too much;
  the tip of the hooks will contact the Clamp plate, causing the hooks and/or Clamp plate to be deformed. In the worst case, the Clamp plate will be caught between the Vertical transport rollers, causing the drum to be stuck in rotation, which will result in the error massage "T1" display on panel.

A: Vertical transport roller (up)
B: Master removal hook
C: Shaft of Vertical transport roller (up)
D: Plunger
E: Master removal solenoid
F: Linking plate
G: Clamp plate



ADJUSTMENT

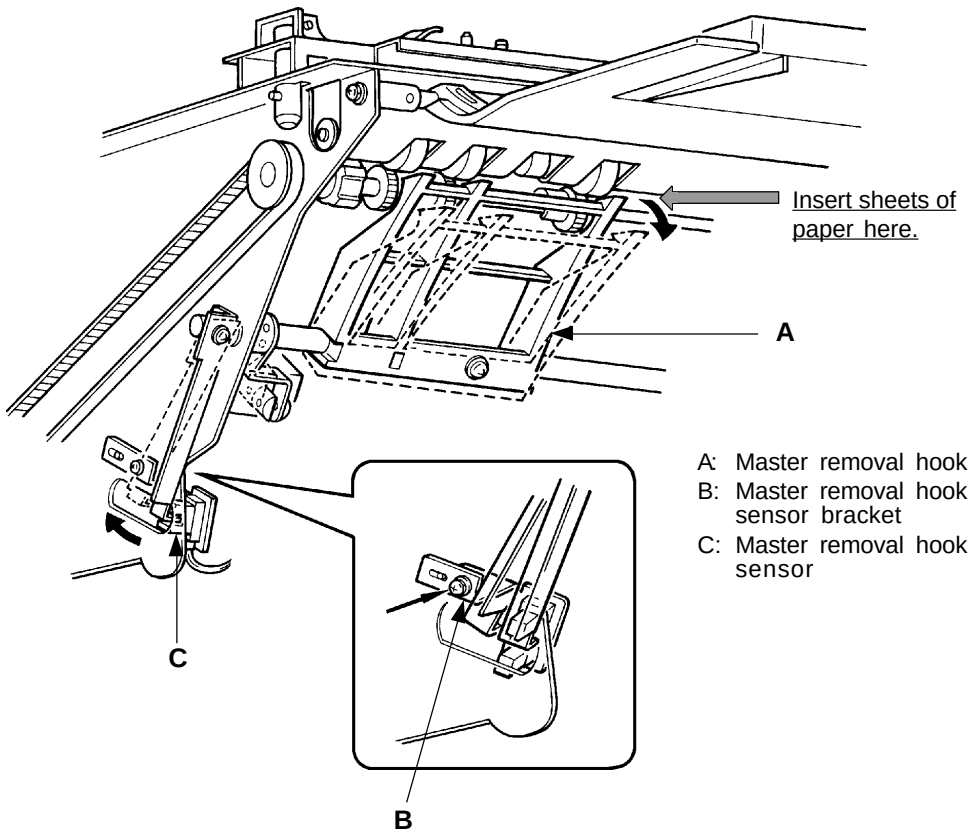
LED TUME Master removal hook sensor
– Light up when light path is opened
Test Mode No.14 Mater removal hook sensor
– Short interval beeps when light path is blocked
No.71 Master removal solenoid

2. Position of Master Removal Hook Sensor

1. Turn ON the power and confirm that the error message "REMOVE JAMMED MASTER IN DISPOSAL UNIT" is not displayed on the operation panel.
2. Open the Scanner table and force both the Scanner table set sw and the Main motor interlock sw to be actuated.
   Insert several sheets of paper into between the Master removal hooks and the M.-remv. vertical transport roller without blocking the light path of the Master removal sensor.
3. Check if the error message "REMOVE JAMMED MASTER IN DISPOSAL UNIT" is displayed under this condition.
4. If not, turn OFF the power and remove the Master removal unit.
5. Loosen the mounting screw of the Master removal hook sensor bracket and adjust the position of the Master removal hook sensor by moving the bracket.

- Results of Misadjustment -

- If the Master removal hook sensor is out of position;
  the error message "REMOVE JAMMED MASTER IN DISPOSAL UNIT" will be displayed without any masters jammed at the entrance of the Master removal unit.



A: Master removal hook
B: Master removal hook sensor bracket
C: Master removal hook sensor

- When the Master removal hook is located at the home position, the light path of the Master removal hook sensor is shut off by the Hook sensor actuator.

CHAPTER 12: FLAT BED SCANNING SECTION

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ADJUSTMENT

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Test Mode No.21 Scanner table set switch
– Short interval beeps when pressed
No.39 Main motor Interlock switch
– Short interval beeps when pressed

THEORY OF OPERATION

1. Scanner Table Setting System

- Basic

The Scanner table is pushed up by two Flat bed dampers when released from the hooks of the machine by holding the Open lever.

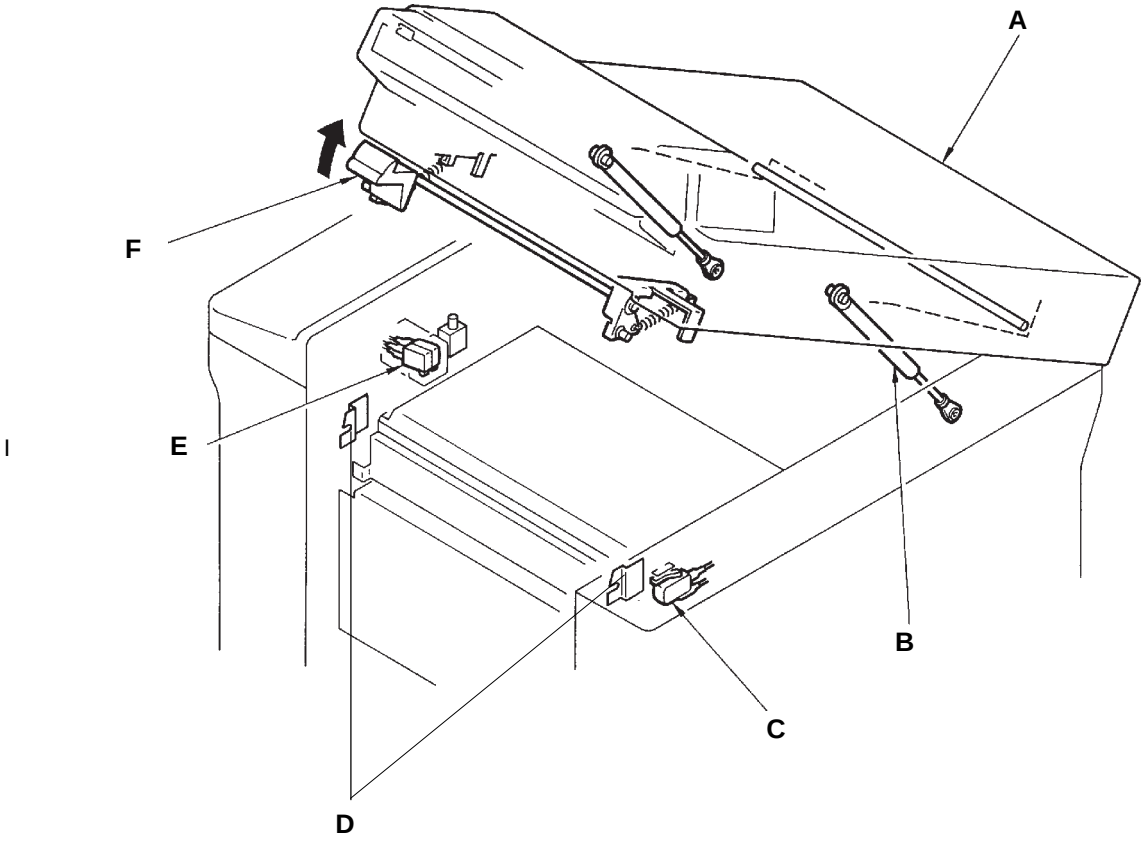
- Function of Flat Bed Set Switch

The Scanner table set switch detects whether the Scanner table is open or closed.

- Function of Interlock Switches

When the Scanner table is opened, the Interlock switches are released OFF, interrupting the power to the Main motor and Thermal print head.

A: Scanner table
B: Flat bed damper
C: Scanner table set switch
D: Hooks
E: Interlock switches
(for Main motor & Thermal print head)
F: Open lever



When the Scanner table set switch or Interlock switch is released OFF, the error message “CLOSE SCANNER TABLE” is displayed.

Flat bed PCB LED 1 Flat bed original detection sensor
– Light up when reflected light detected
Test Mode No.51 Stage cover sensor
– Short interval beeps when light path is blocked
No.52 Flat bed original detection sensor
– Short interval beeps when reflected light detected

2. Flat Bed Original Detection System

- Basic

When an original is placed on the Stage glass, the machine status is changed from "printing" to "master making".

- Function of Stage Cover Sensor

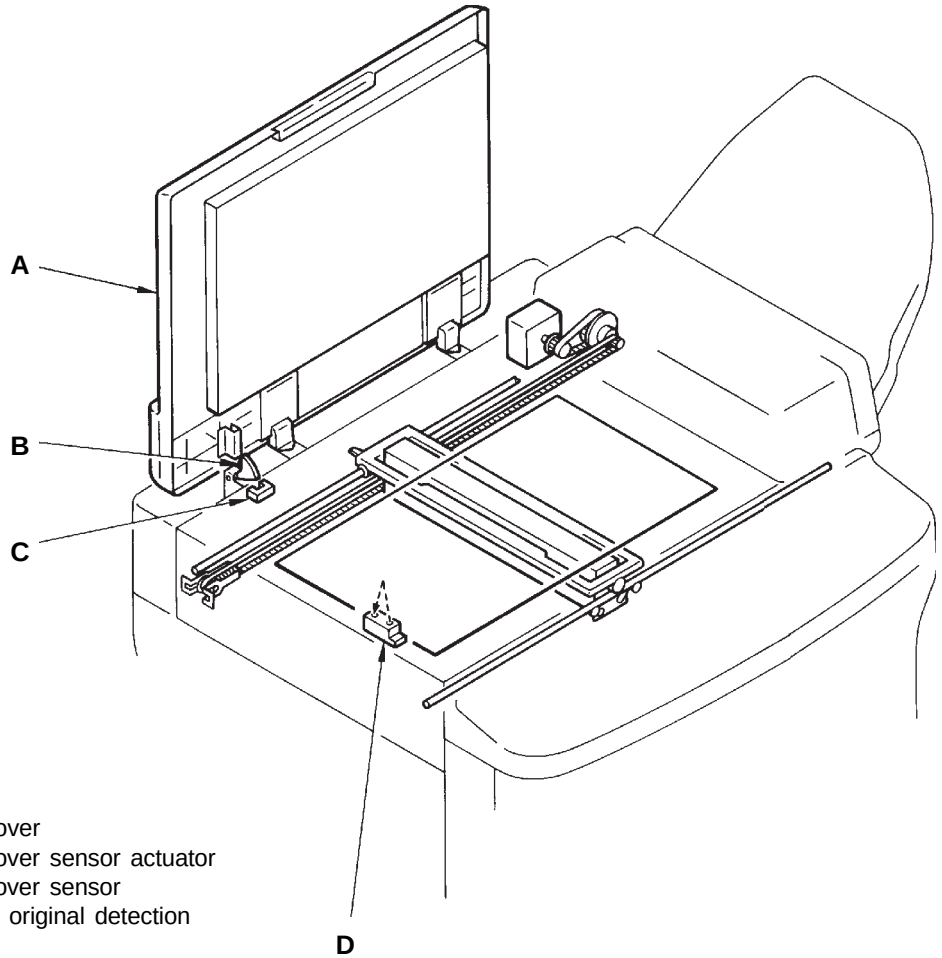
The Stage cover sensor checks whether the Stage cover is open or closed by checking its light path.

The light path of the sensor is blocked by the Stage cover sensor actuator when the Stage cover is closed more than halfway down.

- Function of Flat Bed Original Detection Sensor

When the light path of the Stage cover sensor is blocked, the Flat bed original detection sensor checks for the presence of an original on the Stage glass.

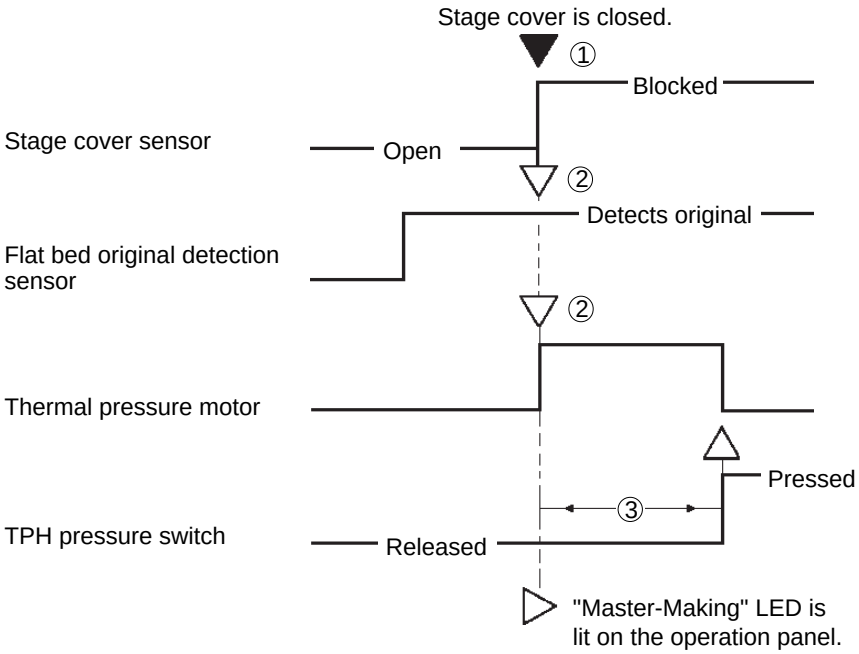
When the sensor detects an original on the Stage glass, the "Master-Making/Print" LED on the operation panel is changed from "Print" to "Master-Making" and the Thermal pressure motor is activated to lower the Thermal print head until the TPH pressure switch is pressed.



A: Stage cover
B: Stage cover sensor actuator
C: Stage cover sensor
D: Flat bed original detection sensor

- Timing Chart -

Flat Bed Original Detection System



① FB-ADF Original detection sensor is not pressed.
Both the ADF switch and Flat bed set switch are pressed.
② When the Flat bed original detection sensor detects an original, the Thermal presssure motor is activated to lower the Thermal print head until the TPH pressure switch is pressed.
③ If the TPH pressure switch is not pressed **within 4 seconds** after the TPH pressure motor is activated, it is assumed that the Thermal presssure motor has been locked and the message **[T 19]** is displayed.

3. Image Scanner Initial Movement System

- Conditions for Image Scanner Initial Movements

The Image scanner makes either of the two initial movements mentioned below in the following cases:

Initial Movement 1

1) The power is turned ON or "ALL RESET button is pressed without originals on the ADF tray.
2) The Book processing feature is cancelled.

Initial Movement 2

1) The power is turned ON or "ALL RESET button is pressed with originals on the ADF tray.
2) The ADF original detection sensor is actuated ON by placing originals on the ADF tray.
3) The Book processing feature is selected.

- Image Scanner Initial Movement 1

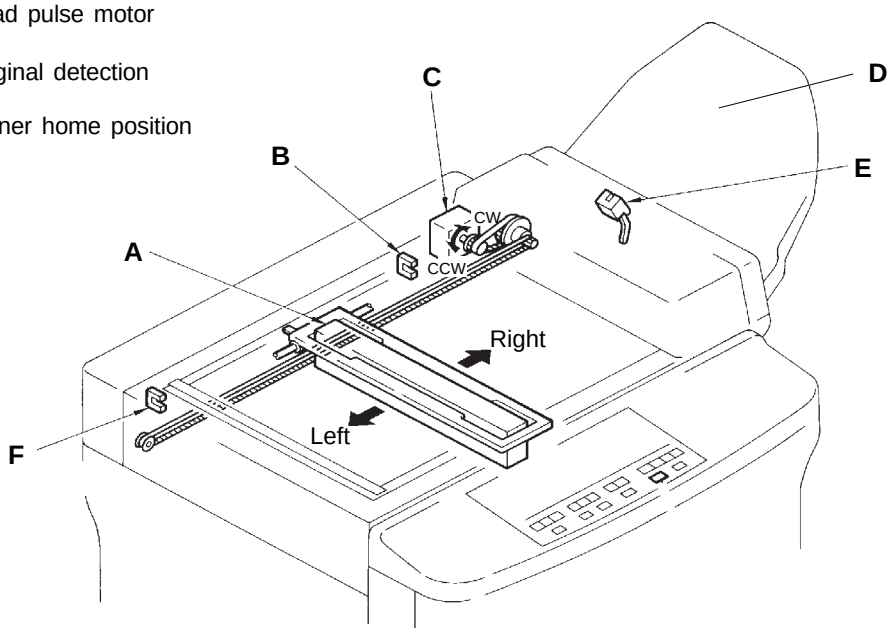
(i) If the Image scanner home position sensor is not detecting the bracket of the Image scanner, the Flat bed read pulse motor is activated to transfer the Image scanner to the left until the sensor detects the bracket.
(ii) If the sensor is detecting the bracket, the Image scanner stays still.

- Image Scanner Initial Movement 2

(i) If the Image scanner ADF shading sensor and Image scanner home position sensor are not detecting the bracket of the Image scanner, the Flat bed read pulse motor is activated to transfer the Image scanner to the left.
- If the Image scanner ADF shading sensor detects the bracket of the Image scanner **within 2204 pulses** after the Flat bed read pulse motor is activated, it is assumed that the Image scanner is located under the ADF unit and the Flat bed read pulse motor is stopped.
- If not, it is assumed that the Image scanner is located outside the ADF unit and the Flat bed read pulse motor starts to reverse after **10msec.** rest, to move the Image scanner to the right until the Image scanner ADF shading sensor detects the bracket of the Image scanner.

(ii) If the Image scanner home position sensor is detecting the bracket of the Image scanner, the Flat bed read pulse motor is activated to transfer the Image scanner to the right until the ADF shading sensor detects the bracket.
(iii) If the ADF shading sensor is detecting the bracket, the Image scanner stays still.

A: Image scanner
B: Image scanner ADF shading sensor
C: Flat bed read pulse motor
D: ADF tray
E: FB-ADF original detection sensor
F: Image scanner home position sensor



THEORY OF OPERATION

Test Mode No.49 Scnner home position sensor
– Short interval beeps when light path is blocked
No.50 Scanner ADF shading sensor
– Short interval beeps when light path is blocked
No.34 ADF original detection sensor
– Short interval beeps when pressed
No.108 FB/R Pulse motor continuous operation

- Timing Chart -

Image Scanner Initial Movement (1)

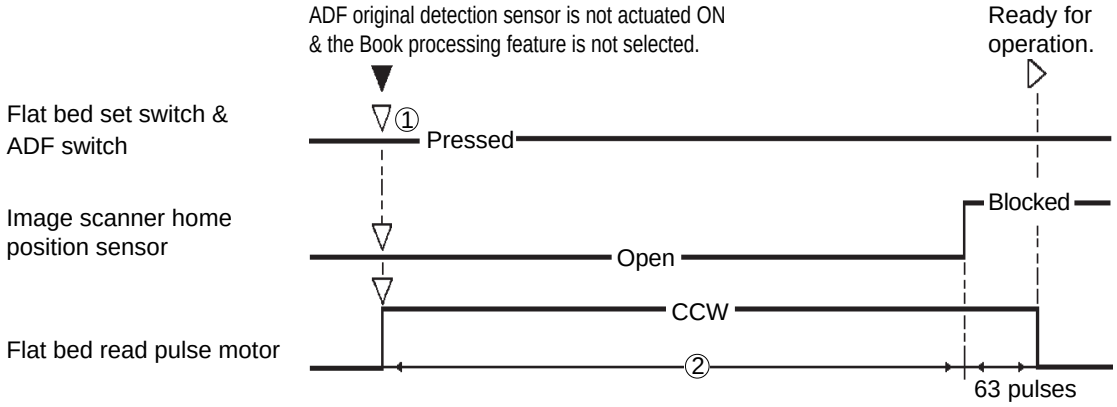
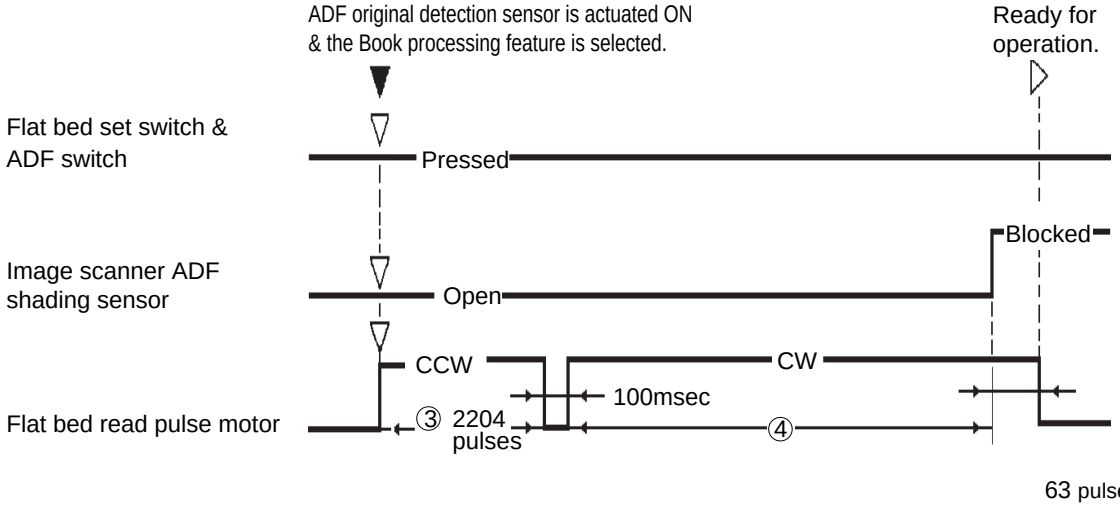


Image Scanner Initial Movement (2)



① If the Flat bed set switch is not pressed, the error message “CLOSE SCANNER TABLE” is displayed.
If the ADF switch is not pressed, the error message “CLOSE ADF COVER” is displayed.

② If the Image scanner home position sensor does not detect the bracket of the Image scanner **within 18898 pulses** after the Flat bed read pulse motor is activated (CCW), it is assumed that the Flat bed read pulse motor has been locked and the error code **[T 15]** is displayed.

③ If the Image scanner ADF shading sensor has detected the bracket of the Image scanner **within 2204 pulses** after the Flat bed read pulse motor is activated (CCW), the Flat bed read pulse motor is stopped after making additional **63-pulses** turns(CCW).
If the Image scanner home position sensor has detected the bracket of the Image scanner **within 2204 pulses** after the Flat bed read pulse motor is activated (CCW), the Flat bed read pulse motor rests for **100msec.**, and then reverses rotation (CW).

④ If the Image scanner ADF shading sensor has not detected the Image scanner **within 15748 pulses** after the Flat bed read pulse motor reverses rotation (CW), it is assumed that the Flat bed read pulse motor has been locked and the error code **[T 15**] is displayed.

* If the Flat bed read pulse motor is turned on for 800 pulses, the Image Scanner will move 1 inch(25.4 mm).(1 mm=31.5 pulses)

T15 (Flat Bed Read Pulse Motor Lock)
• Scanner home position not turned on • Scanner ADF shading sensor not turned on

4. Image Scanning System - in Auto Scanning Contrast Adjustment Mode

- Basic

The Image scanner is located at the Image scanner home position sensor, and the reading of the original background density starts after the shading compensation is made.

- Reading (Detection) of Original Background Density [AUTO BASE CONTROL]

By placing an original on the Stage glass and pressing the START button, the LEDs of the Image scanner are turned ON and the shading compensation is made.

200msec. later, the Flat bed read pluse motor is activated to move the Image scanner to the right.

598 pulses (19mm) after the Image scanner gets out of the Image scanner home position sensor, the Image scanner reads the original background density. This reading of the original background density is repeated twice, i.e. **81 pulses (2.57mm)** after the initial reading spot and **81 pulses (2.57mm)** after the second reading spot.

- Return Home of Image Scanner

10msec. after the third reading of the original background density is finished, the Flat bed read pulse motor starts to reverse rotation to return the Image scanner to the home position (at the Image scanner home position sensor).

- Start of Image Scanning

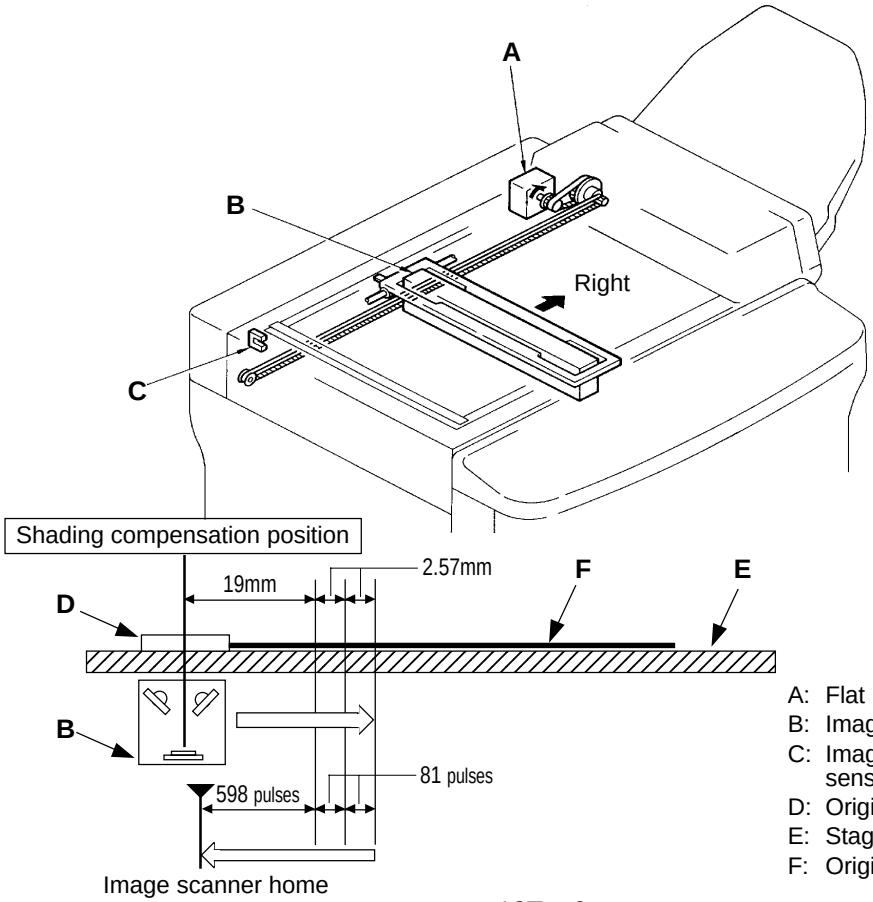
When the Image scanner returns to the home position, the Flat bed read pulse motor reverses the rotation, leading the Image scanner to start moving to the right again.

Subsequently, image is scanned in the same way as when scanning images without the Book processing feature.

- Availability of Auto Scanning Contrast Adjustment Mode

This functions only when the original read density is set to “AUTO.”

The Auto scanning contrast adjustment mode is not available when any of the following features is selected; Photo mode, Duo mode, Dot photo mode or Book processing feature.

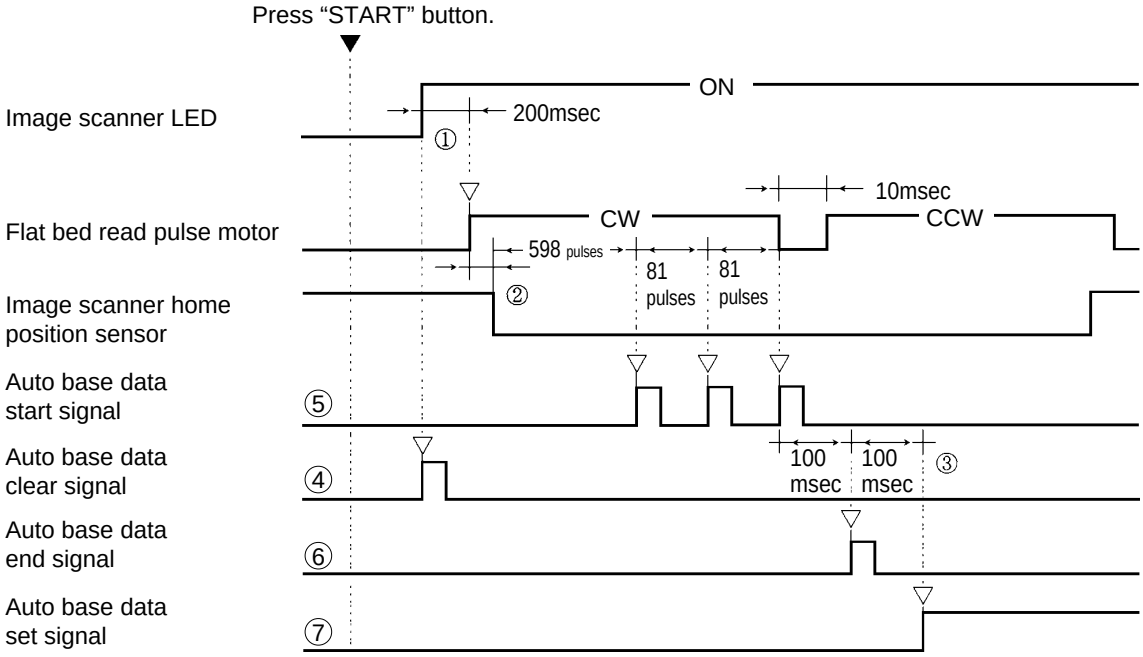


A: Flat bed read pulse motor
B: Image scanner
C: Image scanner home position sensor
D: Original stopper
E: Stage glass
F: Original

Test Mode No.49 Scnner home position sensor
– Short interval beeps when light path is blocked
No.79 Image scanner LED lighting

- Timing Chart -

Image Scanning System - in Auto Scanning Contrast Adjustment Mode



① The shading compensation is made automatically when the LEDs of the Image scanner are turned ON.
② If the Image scanner has not gone out of the Image scanner home position sensor **within 314 pulses** after the Flat bed read pulse motor is activated, i.e. the light path of the sensor has not been opened, it is assumed that the Flat bed read pulse motor has been locked and the error message **"T15 CALL SERVICE"** is displayed on the operation panel.
③ If the Auto base data set signal has not been turned ON 100 msec after the Auto base data end signal is output, the operation is interrupted after the Image scanner returns to the home position and the error message **"T10 TURN MAIN POWER SW. OFF THEN ON"** is displayed on the operation panel.
④ If the Auto base data clear signal is turned on, the previous Auto base data will be cleared.
⑤ If the Auto base data start signal is turned on, the image data will be taken in by the image scanner.
⑥ The Auto base data end signal is to signal the end of taking in the image data.
⑦ The Auto base data set signal is turned on when the Auto base data is stored.

T15 (Flat Bed Read Pulse Motor Lock)
• Scanner home position sensor not turned off

T10 (Image Precessing PCB Failure)
• Auto base data set signal not turned on

5. Image Scanning System - Without Book Processing Feature & ADF

- Basic

The Image scanner is located at the Image scanner home position sensor, and the scanning starts after the shading compensation is made.

- Start of Image Scanning

By placing an original on the Stage glass and pressing the START button, the LEDs of the Image scanner are turned ON and the shading compensation is made.

200msec later, the Flat bed read pluse motor is activated to move the Image scanner to the right.

472 pulses after the Image scanner goes off the Image scanner home position sensor, the Read & Write start signal is turned ON and the image scanning starts.

At the same time, the Master making and Master removal processes take place.

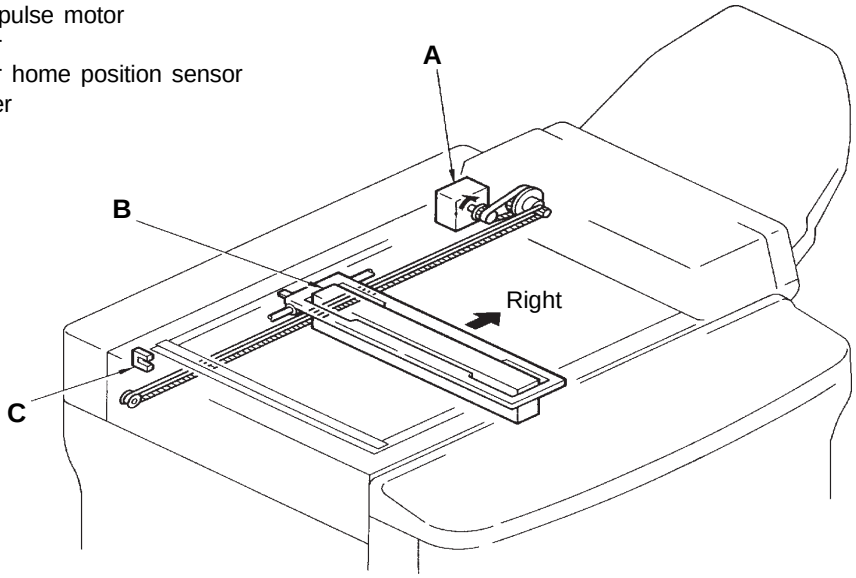
- End of Image Scanning

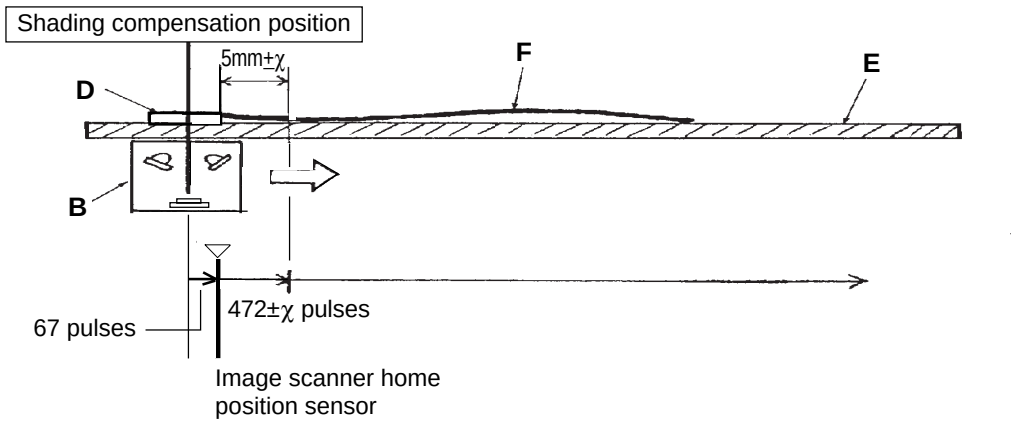
When a master is made for the size of the paper on the Paper feed tray, the Read & Write start signal and the Flat bed read pulse motor are turned OFF to end the image scanning process. When the Read & Write start signal is turned OFF, the master making process is also finished and a new-made master starts to be loaded on the Drum after confirming that a used master has been removed completely.

- Return to Home of Image Scanner

200msec after the Read & Write start signal is turned OFF, the LEDs of the Image scanner are turned OFF and the Flat bed read pulse motor starts to reverse rotation to return the Image scanner to the home position (at the Image scanner home position sensor).

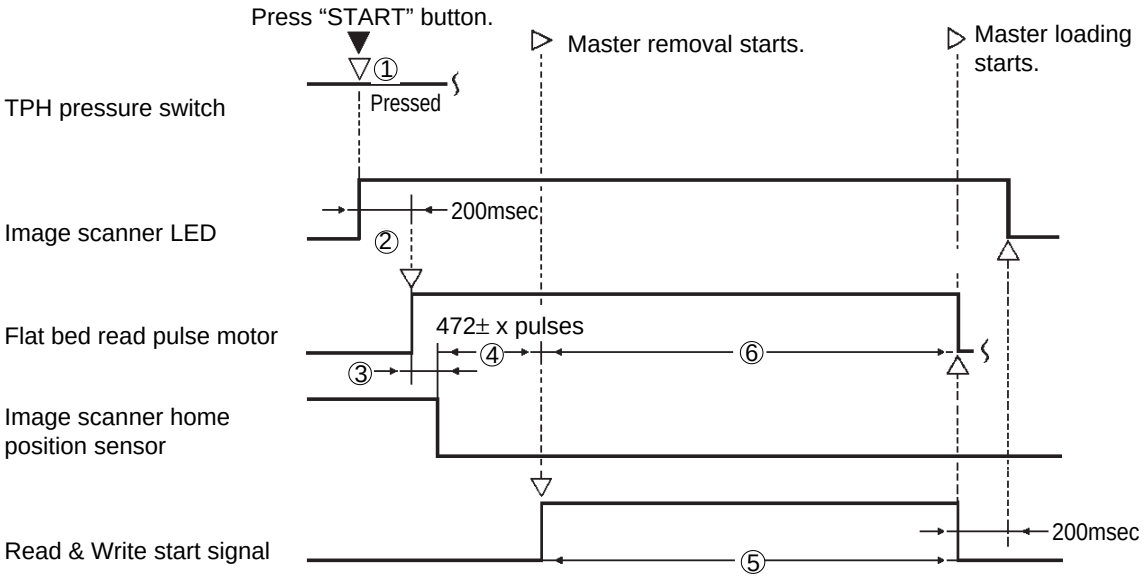
A: Flat bed read pulse motor
B: Image scanner
C: Image scanner home position sensor
D: Original stopper
E: Stage glass
F: Original





- Timing Chart -

Image Scanning System - Without Book Processing Feature & ADF



① If the TPH pressure switch is not pressed, the Thermal pressure motor is rotated until the switch is pressed.
The image scanning starts only after the TPH pressure switch is pressed.
② The shading compensation is made automatically when the LEDs of the Image scanner are turned ON.
③ If the Image scanner has not gone off the Image scanner home position sensor **within 314 pulses** after the Flat bed read pulse motor is activated, i.e. the light path of the sensor has not been opened, it is assumed that the Flat bed read pulse motor has been locked and the error code **[T 15]** is displayed on the operation panel.
④ The "x" pulse can be increased or decreased by Memory switch **No.213**.
⑤ The Read & Write start signal is turned OFF when a master is made for the size of the paper on the Paper feed tray.
⑥ If Read & Write start signal has not been turned OFF **within 13701 pulses** after it is turned ON, the signal and the LEDs of the Image scanner are turned OFF compulsively.

T15 (Flat Bed Read Pulse Motor Lock)
• Scanner home position sensor not turned off

6. Pre-Scanning System - With Book Processing Feature & Without ADF

- Basic

The Image scanner is located at the Image scanner ADF shading sensor, and the pre-scanning starts after the shading compensation is made.

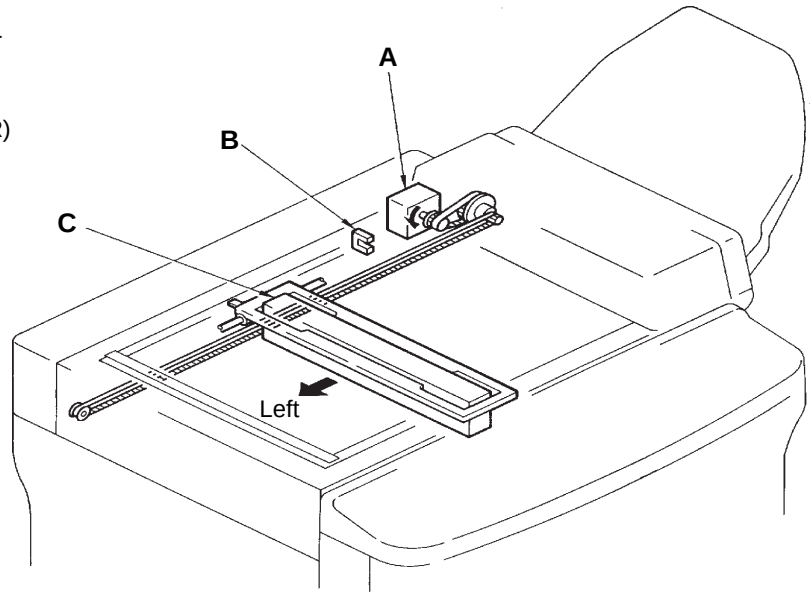
- Start of Pre-Scanning (Check of Original Size)

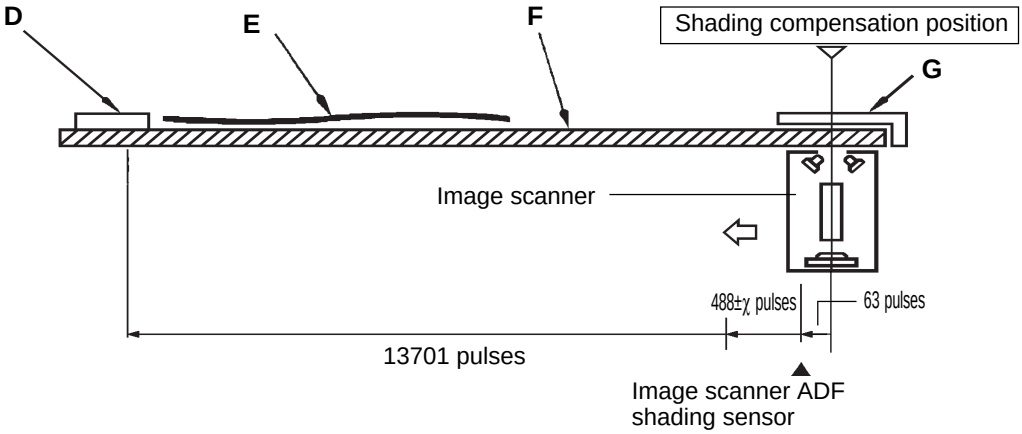
By placing an original on the Stage glass and pressing the START button, the LEDs of the Image scanner are turned ON and the shading compensation is made.
200ms later, the Flat bed read pulse motor is activated to move the Image scanner to the left.
488 pulses after the Image scanner goes off the Image scanner ADF shading sensor, the Image scanner starts to scan the original to find its size before scanning images.

- End of pre-Scanning

13701 pulses later, the Flat bed read pulse motor is deactivated to finish the pre-scanning operation and the image scanning process is started.

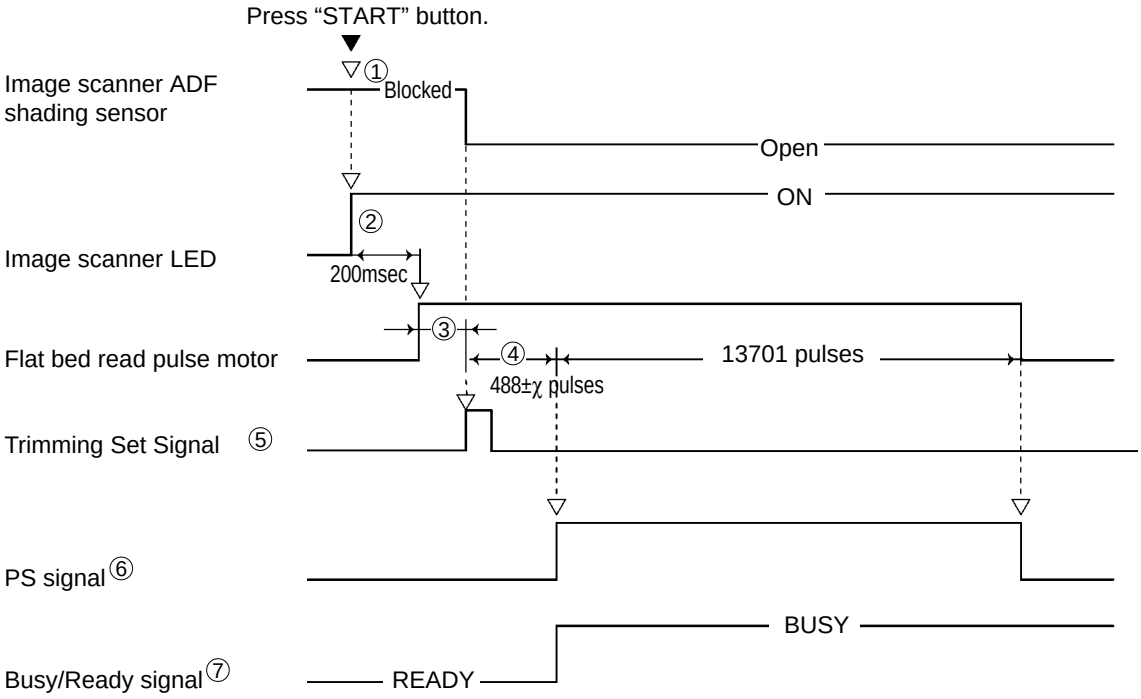
A: Flat bed read pulse motor
B: Image scanner ADF shading sensor
C: Image scanner
D: Original stopper
E: Original
F: Stage glass
G: Glass holder (R)





- Timing Chart -

Pre-Scanning System - With Book Processing Feature & Without ADF



① If the Image scanner ADF shading sensor is not detecting the bracket of the Image scanner, the Image scanner is moved to the ADF shading position to set the Image scanner ready for the pre-scanning process.
② The Shading compensation is made automatically when the LEDs of the Image scanner are turned ON.
③ If the Image scanner has not gone off the Image scanner ADF shading sensor **within 314 pulses** after the Flat bed read pulse motor is activated, it is assumed that the Flat bed read pulse motor has been locked and the error code **[T 15]** is displayed on the operation panel.
④ The"x" pulse can be increased or decreased by Memory switch **No.214**.
⑤ The trimming set signal is the signal to start of trimming. It is output from the Image Processing PCB to the Trimming PCB, clearing the previous trimming data.
⑥ The PS signal is the command to confirm the size of the original, which is output from the Image processing PCB to the Trimming PCB.
⑦ "Busy" signal is output from the Trimming PCB to the Image processing PCB while the Trimming PCB is calculating and confirming the original size.

T15 (Flat Bed Read Pulse Motor Lock)
• Scanner ADF shading sensor not turned off

7. Image Scanning System - With Book Processing Feature & Without ADF

- Basic

After the pre-scanning is finished, the Image scanner starts to scan images.
The Shading compensation is already made at the beginning of the pre-scanning process.

- Start of Image Scanning

When the pre-scanning is finished and the original size is calculated, the Flat bed read pulse motor is activated to move the Image scanner to the right.
When the Flat bed read pulse motor rotates by a given number of pulses, which is given as a result of the original size calculation, the Read & Write start signal is turned ON, leading the Image scanner to start scanning images.
At the same time, the Master making and Master removal processes take place.

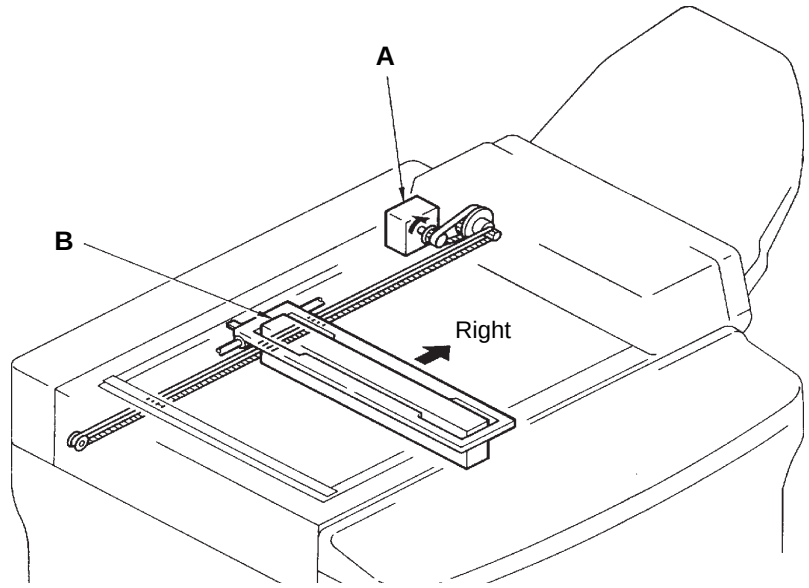
- End of Image Scanning

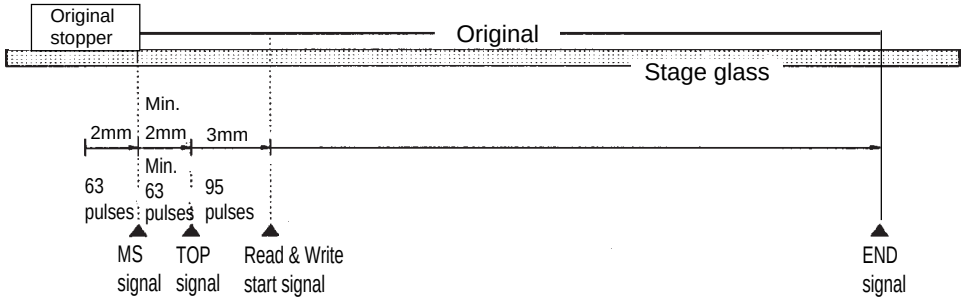
When images are scanned for the calculated size of the original or if a master is made for the size of the paper on the Paper feed tray, the Read & Write start signal and the Flat bed read pulse motor are turned OFF to end the image scanning process.
When the Read & Write start signal is turned OFF, the master making process is also finished and a new-made master starts to be loaded on the Drum after confirming that a used master has been removed completely.

- Return to Home of Image Scanner

200msec after the Read & Write start signal is turned OFF, the LEDs of the Image scanner are turned OFF and the Flat bed read pulse motor restarts rotating to return the Image scanner to the home position for the Book processing feature (at the Image scanner ADF shading sensor).

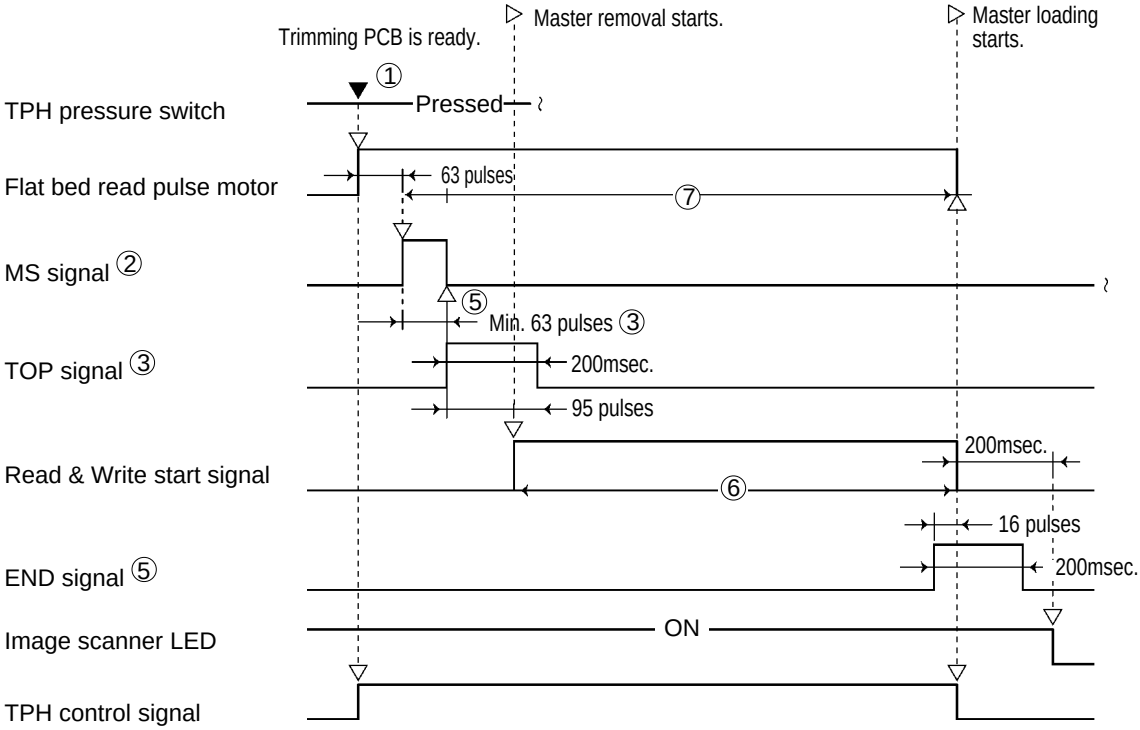
A: Flat bed read pulse motor
B: Image scanner





- Timing Chart -

Image Scanning System - With Book Processing Feature & Without ADF



① The image scanning starts only after the TPH pressure switch is pressed ON.
If the TPH pressure switch is not pressed ON, the Thermal pressure motor is rotated until the switch is pressed.

② The MS signal is the signal to start image scanning, which is output from the Image processing PCB to the Trimming PCB.

③ The TOP signal is the signal to identify the top position of the original confirmed during the pre-scanning process, which is output from the Trimming PCB to the Image processing PCB.
The TOP signal is output from the Trimming PCB **63 ~ 158 pulses** after the MS signal is received by the Trimming PCB.
The start position of image writing (master making) is automatically compensated, even though an original is misplaced away from the Original stopper on the Stage glass, if the lead edge remains **within 3mm** from the Original stopper.

④ If the TOP signal has not been output **within 315 pulses** after the the MS signal is output, it is assumed that the Trimming PCB is faulty and the error code **[T 10]** is displayed on the panel.

⑤ The END signal is the signal indicating the tailing edge of the original which is confirmed during the pre-scanning process. It is output from the Trimming PCB to the Image processing PCB.

⑥ If the Write pulse motor has rotated for the size of the paper on the Paper feed tray, the Read & Write start signal and the LEDs of the Image scanner are turned OFF even before the END signal is output.

⑦ After the MS signal is output, if the END signal has not been output **within 13701 pulses** after the Flat bed read pulse motor is activated, the Read & Write start signal and the LEDs of the Image scanner are turned OFF, and a new-made master starts to be loaded on the Drum.

T10 (Image Processing PCB)
• TOP Signal not turned ON from Trimming PCB

MEMO

REMOVAL & ASSEMBLY

1. Stage Glass

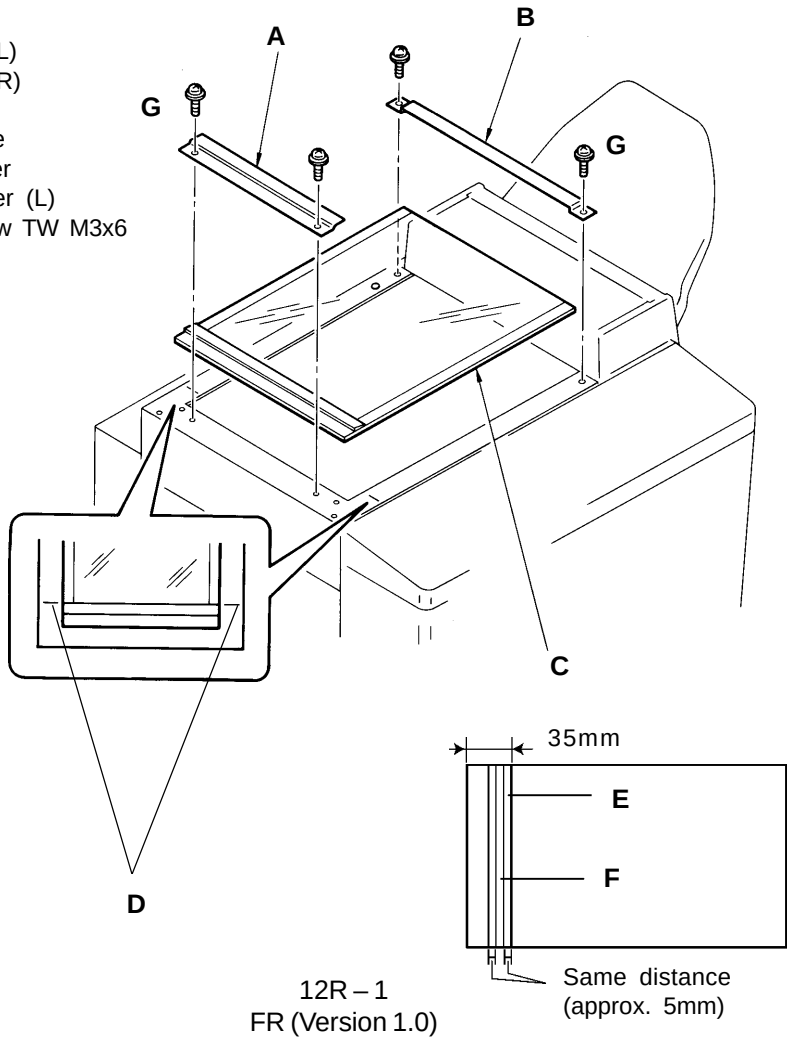
< Removal Procedure >

1. Turn OFF the power and remove all Scanner covers (front, rear, right and left).
   [Note]
   If the machine is equipped with the ADF unit, remove the FB-ADF covers (F) and (R).
2. Remove two screws each from the Glass holder (L) and Glass holder (R), and remove these two Glass holders.
3. Lift and remove the Stage glass.

- Precautions in Assembly -

- When placing the Stage glass back on the machine, touch the edges of the glass and their extended lines with the frames of the positioning lines on the Scanner table frame, as shown below.
- Do not scratch, stain or damage the Shading plate attached underneath the Glass holder (R).
- When replacing the Original stopper and Shading plate (L) underneath on the Stage glass, attach them on the Stage glass as shown in the figure below.
- Check the scanning start position after assembly (Page12A-1)

A: Glass holder (L)
B: Glass holder (R)
C: Stage glass
D: Positioning line
E: Original stopper
F: Shading stopper (L)
G: Pan-head Screw TW M3x6



2. Image Scanner

< Removal Procedure >

1. Turn OFF the power and remove the Stage glass, referring to the previous page.
2. Shift the Image scanner to reach mounting screws.
3. Remove the mounting screw on the Image scanner wire stand.
4. Disconnect the Image flexible wire from the Image scanner.
5. Remove four mounting screws on the Image scanner, and take out the scanner from the Image scanner carriage, lifting it upward gently.

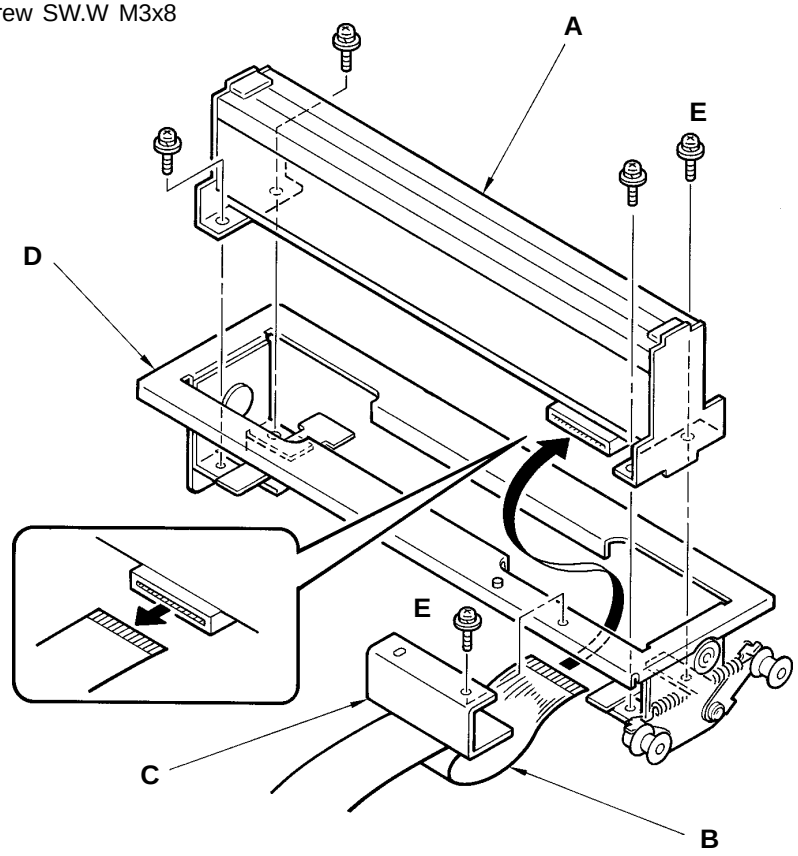
- Precautions in Assembly -

- Confirm that the Image scanner is installed in the Image scanner carriage, parallel to the Scanner table frame.

- Adjustments after Assembly -

- FB Scanning start position(Page 12A-1)
- ADF Scanning start position(Page 13A-2)

A: Image scanner
B: Image flexible wire
C: Image scanner wire stand
D: Image scanner carriage
E: Pan-head Screw SW.W M3x8



3. Image Scanner Carriage

< Removal Procedure >

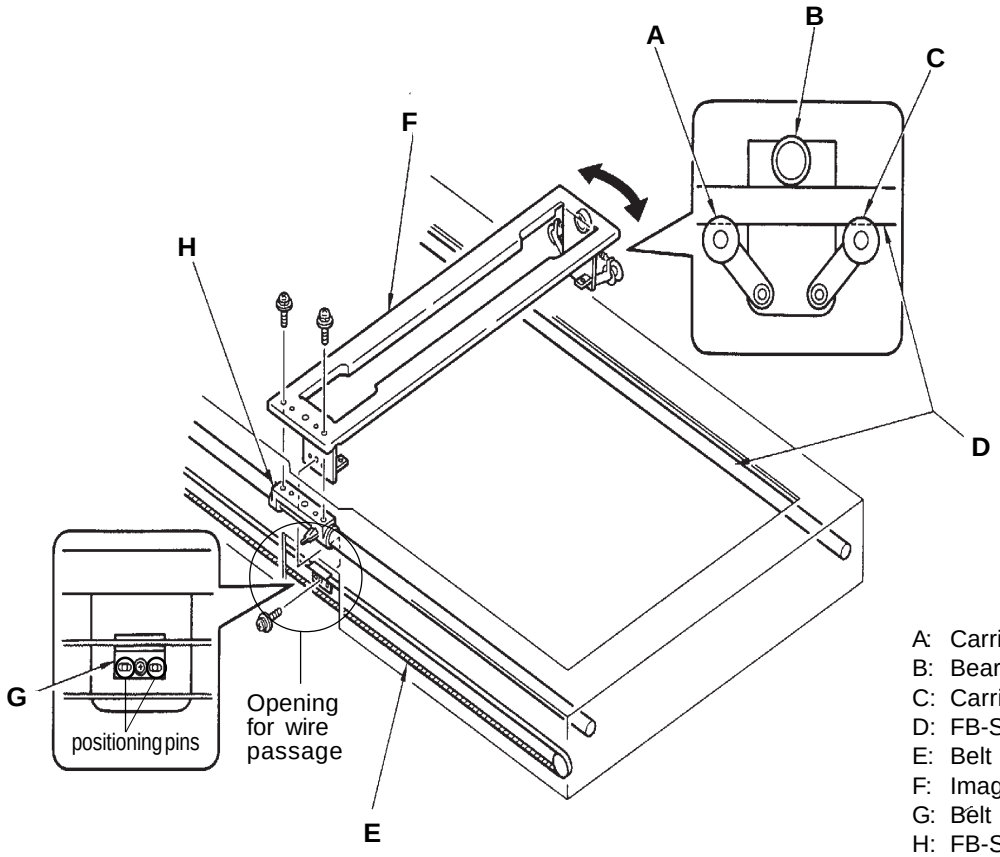
1. Turn OFF the power and remove the Image scanner, referring to the previous page.
2. Shift the Image scanner carriage to the position about at the middle of the Scanner table, where the Scanner table frame is cut to pass the Image flexible wire.
3. Remove the mounting screw on the FB-Scanner belt stand plate and free the plate from the Image scanner carriage.
4. Remove two mounting screws on the Image scanner carriage and separate the carriage from the FB-Scanner slide guide.
5. Gently rock the other end of the Image scanner carriage on the panel side horizontally and free two Carriage guide wheels from the FB-Scanner slide shaft to take out the carriage from the Scanner table.

- Precautions in Assembly -

- Match the positioning pins on the Image scanner carriage with positioning holes on the FB-Scanner belt stand plate when attaching the belt stand plate onto the carriage.
  The positioning pins can be located at any part of the holes.

- Adjustments after Assembly -

- FB Scanning start position(Page 12A-1)
- ADF Scanning start position(Page 13A-2)



A: Carriage guide wheel
B: Bearing
C: Carriage guide
D: FB-Scanner slide shaft
E: Belt
F: Image scanner carriage
G: Belt stand plate
H: FB-Scanner slide guide

4. Flat Bed Read Pulse Motor

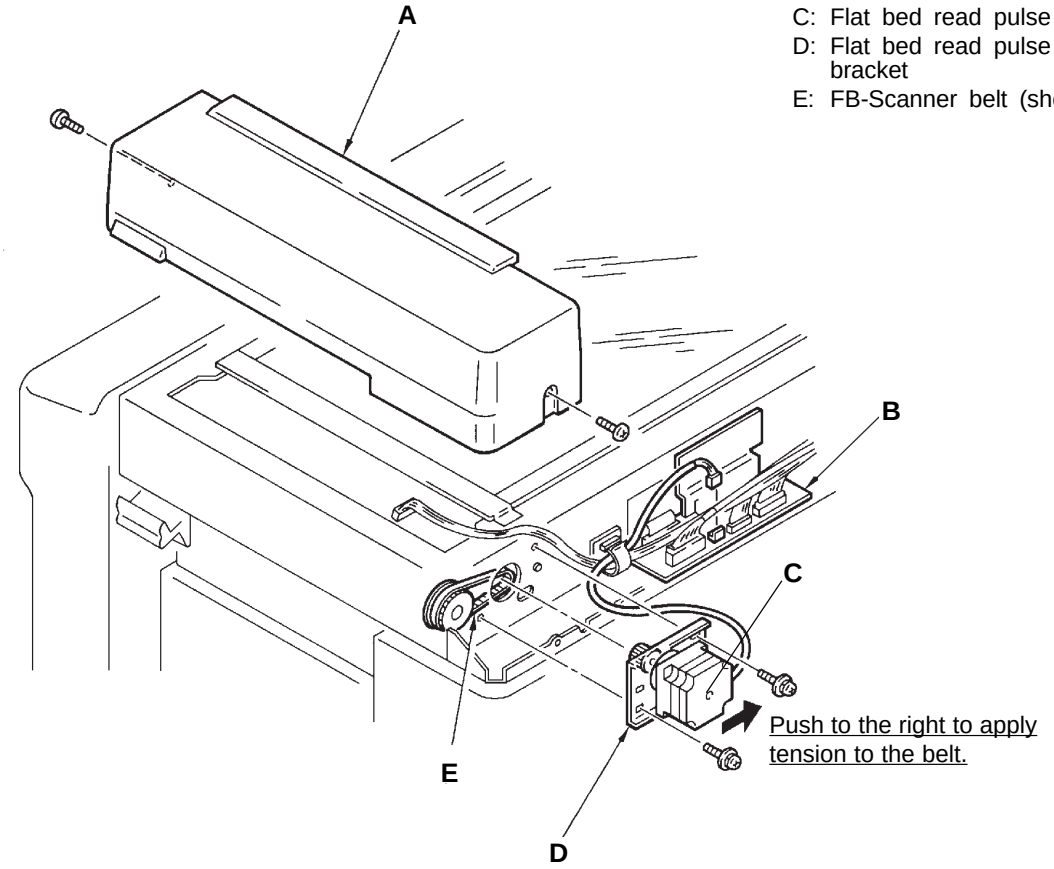
< Removal Procedure >

1. Turn OFF the power, and remove the FB-Scanner cover (right) by removing two mounting screws.
   [Note]
   If the machine is equipped with FB-ADF unit, remove the FB-ADF unit.
2. Remove two mounting screws of the Stage cover, and remove the Stage cover.
3. Unplug the connector of the Flat belt read pulse motor from **CN3** of the **Flat bed PCB**.
4. Remove two mounting screws on the Flat bed read pulse motor bracket, and remove the motor from the Scanner table frame together with the bracket.
5. Remove two mounting screws of the Flat bed read pulse motor and separate the bracket from the motor.

- Precautions in Assembly -

- When securing the motor, tighten the mounting screws, pushing the motor to the right to apply enough tension to the FB-Scanner belt (short).
- Make sure to match the positioning pins on the Scanner table frame into the positioning holes of the Flat bed read pulse motor bracket.

A: FB-Scanner cover (right)
B: Flat bed PCB
C: Flat bed read pulse motor
D: Flat bed read pulse motor bracket
E: FB-Scanner belt (short)



5. FB-Scanner Belts

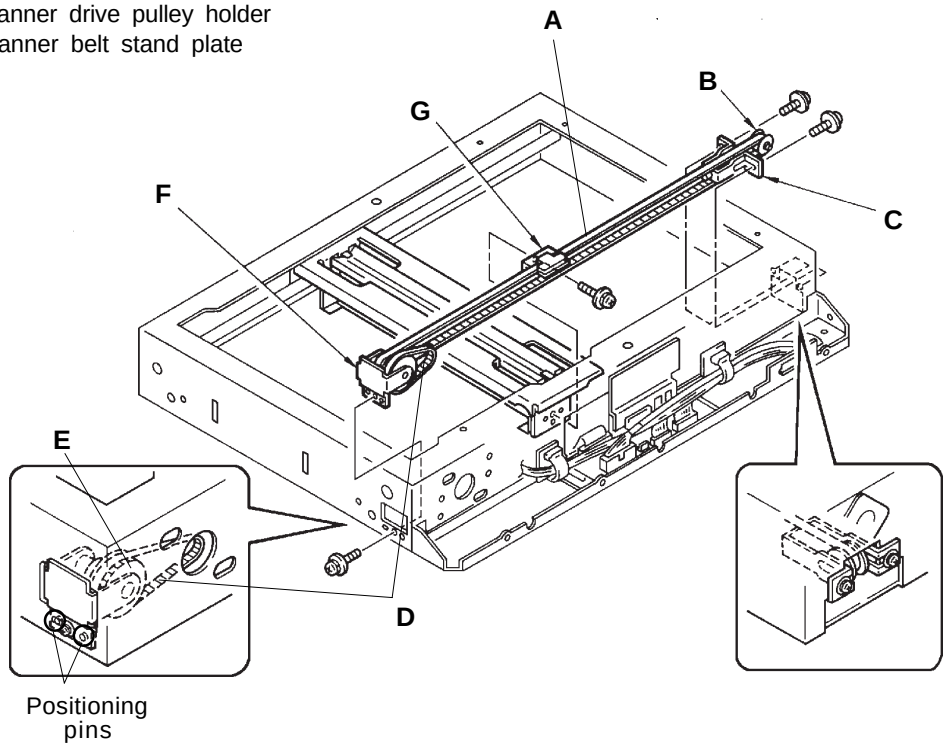
< Removal Procedure >

1. Turn OFF the power, and remove the FB-Scanner cover (right) by removing two mounting screws.
   [Note]
   If the machine is equipped with the ADF unit, remove the ADF unit and FB-ADF cover (right).
2. Remove the Stage glass.
3. Remove the Flat bed read pulse motor.
4. Remove the mounting screw of the FB-Scanner drive pulley holder and separate the holder from the Scanner table frame.
5. Remove the mounting screw of the FB-Scanner belt stand plate to free the plate from the Image scanner carriage.
6. Remove two mounting screws on the FB-Scanner tension holder, and disengage the long FB-Scanner belt from the pulley of the tension holder.
7. Remove the securing screw on the FB-Scanner belt stand plate and separate the plate from the long FB-Scanner belt.

- Precautions in Assembly -

- Match the positioning pins on the Image scanner carriage with positioning holes on the FB-Scanner belt stand plate when attaching the belt stand plate onto the carriage.
  The positioning pins can be located at any part of the holes.
- Match the positioning pins on the FB-Scanner drive pulley holder with the positioning holes on the Scanner table frame.

A: FB-Scanner belt (long)
B: Pulley
C: FB-Scanner tension holder
D: FB-Scanner belt (short)
E: FB-Scanner drive pulley
P: FB-Scanner drive pulley holder
G: FB-Scanner belt stand plate



Flat bed PCB LED 1 Flat bed original detection sensor
– Light up when reflected light detected
Test Mode No.51 Stage cover sensor
– Short interval beeps when light path is blocked
No.52 Flat bed original detection sensor
– Short interval beeps when reflected light detected
No.79 Image scanner LED lighting

6. Image Flexible Wire

< Removal Procedure >

1. Turn OFF the power and remove the Stage glass.
2. Remove the Image scanner wire stand from the Image scanner, disconnect the Image flexible wire from the Image scanner.
3. Remove five mounting screws each of the rails to remove both rails.
4. Remove five mounting screws on the Image flexible wire cover plate, and remove the plate.
5. Disconnect the Image flexible wire from the Flat bed PCB.

- Precautions in Assembly -

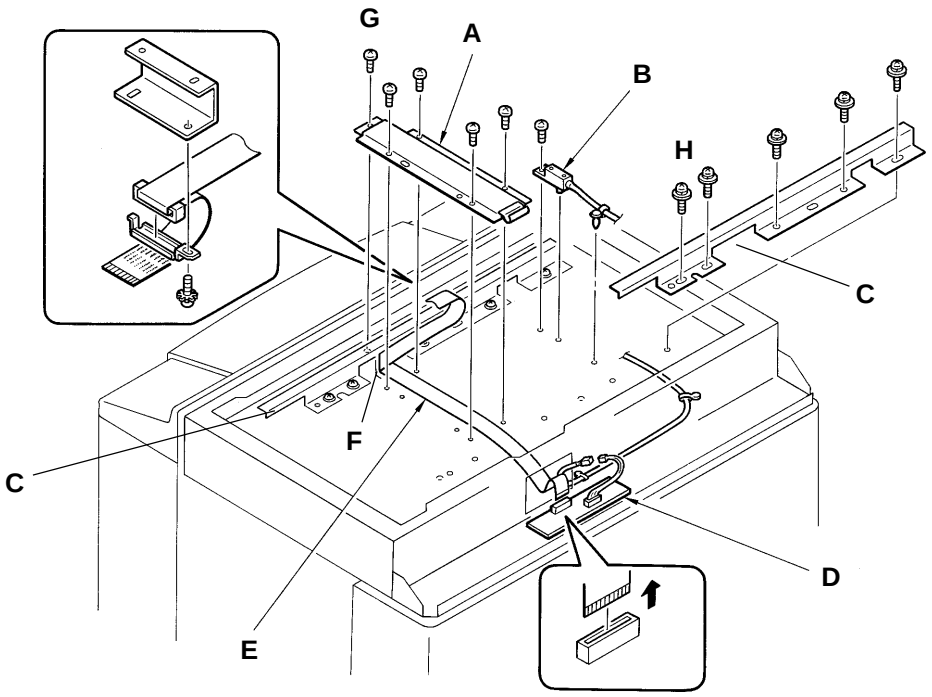
- Secure the bent portion of the Image flexible wire to the guideline-marked position on the bottom plate of the Scanner table, meeting the side edge of the wire with the guide line.

7. Flat Bed Original Detection Sensor

< Removal Procedure >

1. Turn OFF the power and remove the Stage glass.
2. Remove the mounting screw on the Flat bed original detection sensor.
3. Unplug the connector of the sensor just before the Flat bed PCB and take out the sensor.

A: Wire cover
B: Flat bed original detection sensor
C: Rail
D: Flat bed PCB
E: Image flexible wire
F: Positioning line
G: Bind-head Screw M3x4
H: Bind-head Screw M3x6



ADJUSTMENT

1. Scanning Start Position

(1) When Scanning on the Stage Glass (Without the Book procesing feature)

1. Place a ruler with scales engraved from the top edge on the Stage glass, against the Original stopper as shown on the sketch below, and close the Stage cover.
2. Select the PHOTO mode by LINE/PHOTO button and make a master and then print.
3. Check the print and confirm that the top **5±2mm** of the scale is erased on the print.
4. If more or less is erased, use Memory SW **No.213** to make the correction.
5. Press the PRINT POSITION button to select a Memory switch setting referring to the chart on next page.
   For instance, if Memory switch setting number **4** needs to be selected, press the PRINT POSITION button to move the number up or down until the display shows **4 213**.
6. Press the **STOP** button and then the **ALL RESET** button to input the selected number. The panel display returns to an ordinary indication.

SW setting	9	A	B	C	D	E	F	O
Amount (mm)	-2.8	-2.4	-2.0	-1.6	-1.2	-0.8	-0.4	0
SW setting	1	2	3	4	5	6	7	8
Amount (mm)	+0.4	+0.8	+1.2	+1.6	+2.0	+2.4	+2.8	+3.2

← Skip Amount →
(Use the PRINT POSITION key to adjust)

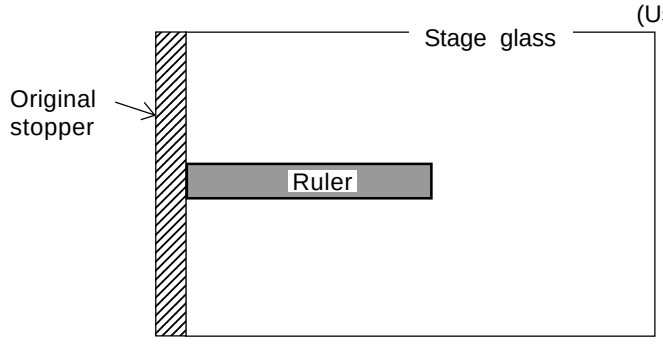
(2) When Scanning on the Stage Glass (With the Book procesing feature)

1. Erase top **3mm** of the ruler with a white correction fluid and place it on the Stage glass, against the Original stopper, and close the Stage cover.
   The **top 3mm must be erased white** to make "white margin" for this adjustment to work properly.
2. Select the PHOTO mode by LINE/PHOTO button and select BOUND BOOK CENTER mode (does not matter if it is Photo or Erase), and make a master and then print.
3. Check the print and confirm that the **5±2mm** of the ruler from its top is erased on the print.
4. If more or less is erased, use Memory SW **No.214** (Test mode No.82) to make the correction.

At Book Mode

SW setting	9	A	B	C	D	E	F	O
Amount (mm)	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0
SW setting	1	2	3	4	5	6	7	8
Amount (mm)	+0.2	+0.4	+0.6	+0.8	+1.0	+1.2	+1.4	+1.6

← Skip Amount →
(Use the PRINT POSITION key to adjust)



2. Horizontal Scanning Position

- When Scanning on the Stage Glass

1. Place **Test chart** on the Stage Glass, against the Original stopper.
2. Make a master at **[1:1]** size and make prints.
3. Check if all "e" marks on both sides of the test chart original appear on the master on the Drum.
4. If not, adjust the horizontal scanning position by Memory SW **No.212**, referring to the chart below.
5. Press the PRINT POSITION button to select a desired Memory switch setting referring to the chart below.
   For instance, if Memory switch setting number **9** needs to be selected, press the PRINT POSITION button to move the number up or down until the display shows **9 212**.
6. Press the **STOP** button and then the **ALL RESET** button to input the selected number.
   The panel display returns to an ordinary indication.

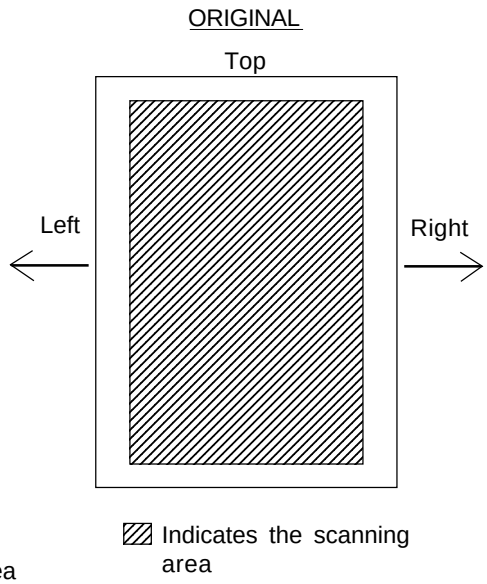
[IMPORTANT]

If "e" marks on both sides are missing in a large area, check the installation position of the **Paper size potentiometer** under the Paper feed tray, and the **Master making width adjustment**.

SW setting	Amount (mm)
9	-3.5
A	-3.0
B	-2.5
C	-2.0
D	-1.5
E	-1.0
F	-0.5
0	0
1	+0.5
2	+1.0
3	+1.5
4	+2.0
5	+2.5
6	+3.0
7	+3.5
8	+4.0

The scanning area shifts to the left.

The scanning area shifts to the right.



(Use the PRINT POSITION key to adjust)

3. Image Elongation/Shrinkage Correction

- When Scanning on the Stage Glass (Flat bed read pulse motor speed adjustment).

1. Make a master at **[1:1]** size using **Test chart** and make prints.
2. Compare printouts with the test chart original.
   Check that the difference in image size is **within 4mm** in the area between the top and bottom scaled lines, between the printouts and the test chart original.
3. If it is elongated or shrunk **by 4mm or more**, compared to the original size, select the Memory SW No.211 and use the PRINT Position Key on the operation panel to select a desired memory SW setting number, referring to the chart low.

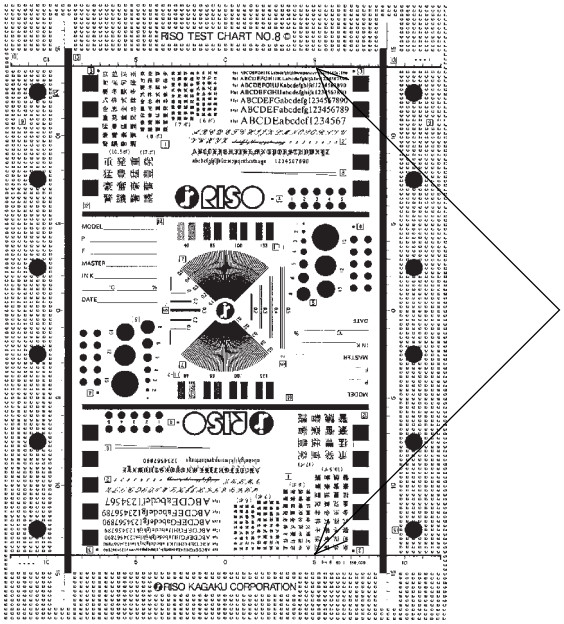
No. 211 FB/R Pulse Motor Speed(Image Expansion) Adjustment

SW setting	9	A	B	C	D	E	F	O
Amount (mm)	-7	-6	-5	-4	-3	-2	-1	0
SW setting	1	2	3	4	5	6	7	8
Amount (mm)	+1	+2	+3	+4	+5	+6	+7	+8

(Use the PRINT POSITION key to adjust)

- Precautions in Adjustment -

- There may be more than one reason for elongation or shrinkage of printed image. Mechanical causes, i.e. backward tension on the master roll, wear of the White roller, loose screw in the pulleys, etc. should also be checked.



[Test Chart No.8]

MEMO

CHAPTER 13: ADF IMAGE SCANNING SECTION

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ADF PCB Original IN sensor
– Light up when light path is blocked

THEORY OF OPERATION

1. ADF Original Loading System

- Basic

An original is loaded into the ADF unit via the Original pickup motor and waits until the "START" button is pressed to start the image scanning operation.

- Start of Original Loading

When originals are set in the ADF unit, they push the actuator out of the ADF original detection sensor.

2 seconds later, the Original pickup solenoid is energized and lowers the ADF pickup roller (upper).

200ms later, the Original pickup motor is energized to turn the ADF pickup roller (upper) and ADFstripper roller (via ADF gear and belt).

- Pickup of One Original

As the ADF stripper is pressed against the ADF stripper roller, one original is separated and fed into the ADF unit by rotation of the ADF stripper roller.

The original pushes the actuator out of the Original registration sensor, and **200ms** later, the Original pickup solenoid and Original pickup motor are turned OFF.

10ms later, the ADF read pulse motor is activated to turn the ADF transfer roller, White roller (Read roller) and ADF exit roller (upper) via pulleys and belts.

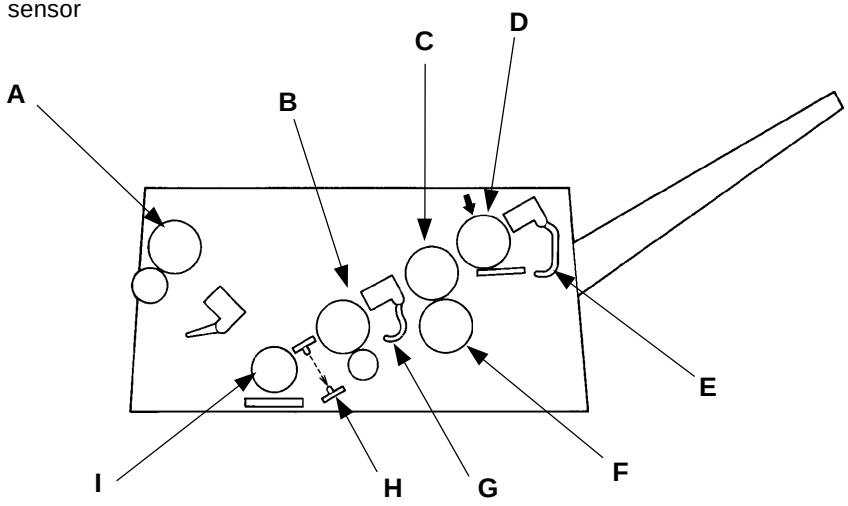
- Finish of Original Loading

The ADF read pulse motor is turned OFF **778 pulses** after the leading edge of the original blocks the light path of the Original IN sensor.

- Change of Panel Display & Preparation for Master Making

The "Master-Making/Print" display on the operation panel is changed from "PRINT" to "MASTER MAKING". At the same time, the Thermal pressure motor is activated to lower the Thermal print head until the TPH pressure switch is pressed.

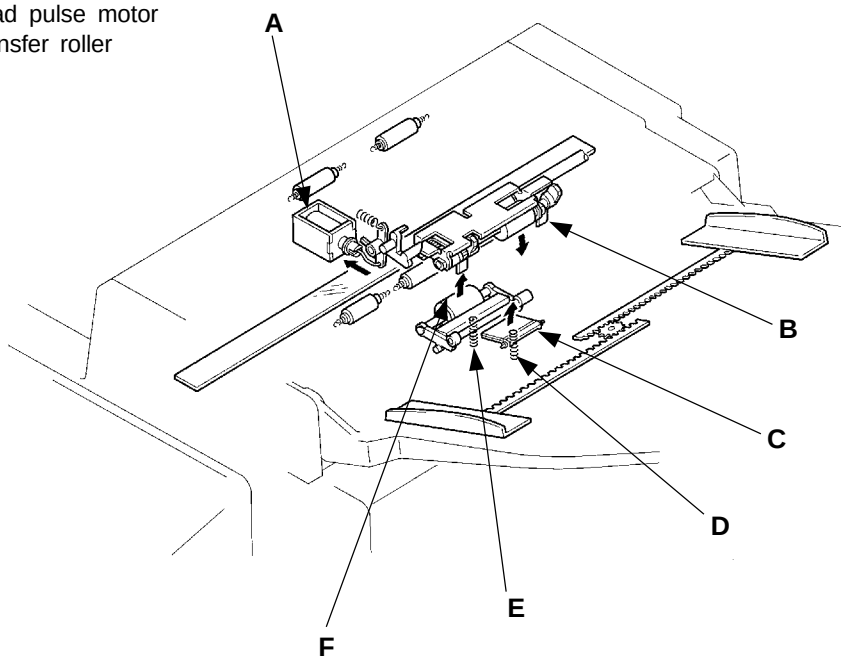
A: ADF exit roller
B: ADF transfer roller
C: ADF stripper roller(upeer)
D: ADF pickup roller(upper)
E: ADF original detection sensor
F: ADF stripper roller(lower)
G: Original registration sensor
H: Original IN sensor
I: White roller

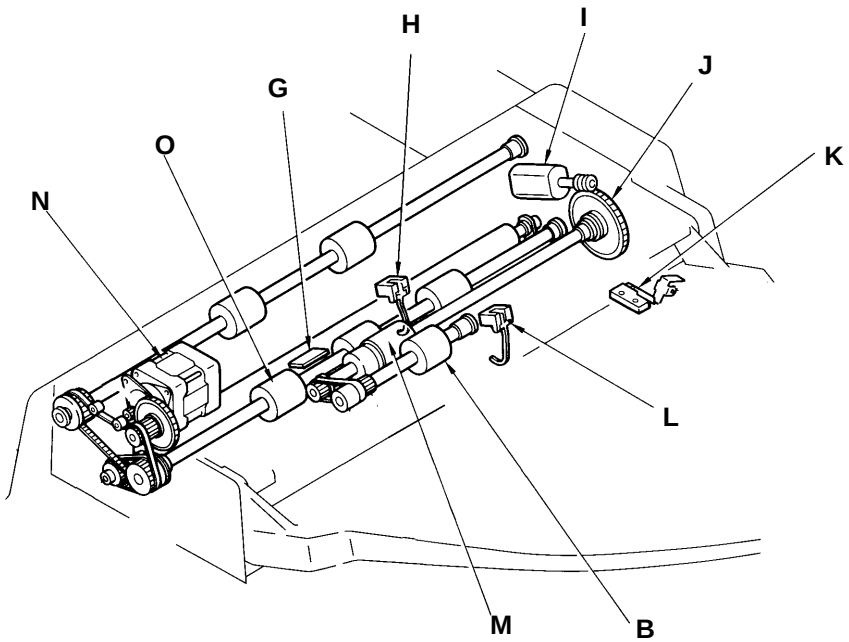


THEORY OF OPERATION

Test Mode No.34 ADF original detection sensor
– Short interval beeps when pressed
No.35 Original registration sensor
– Short interval beeps when pressed
No.36 Original IN sensor
– Short interval beeps when light path is blocked
No.46 ADF SW
– Short interval beeps when pressed
No.76 Original pickup solenoid
No.78 Original pickup motor
No.113 ADF original feed operation

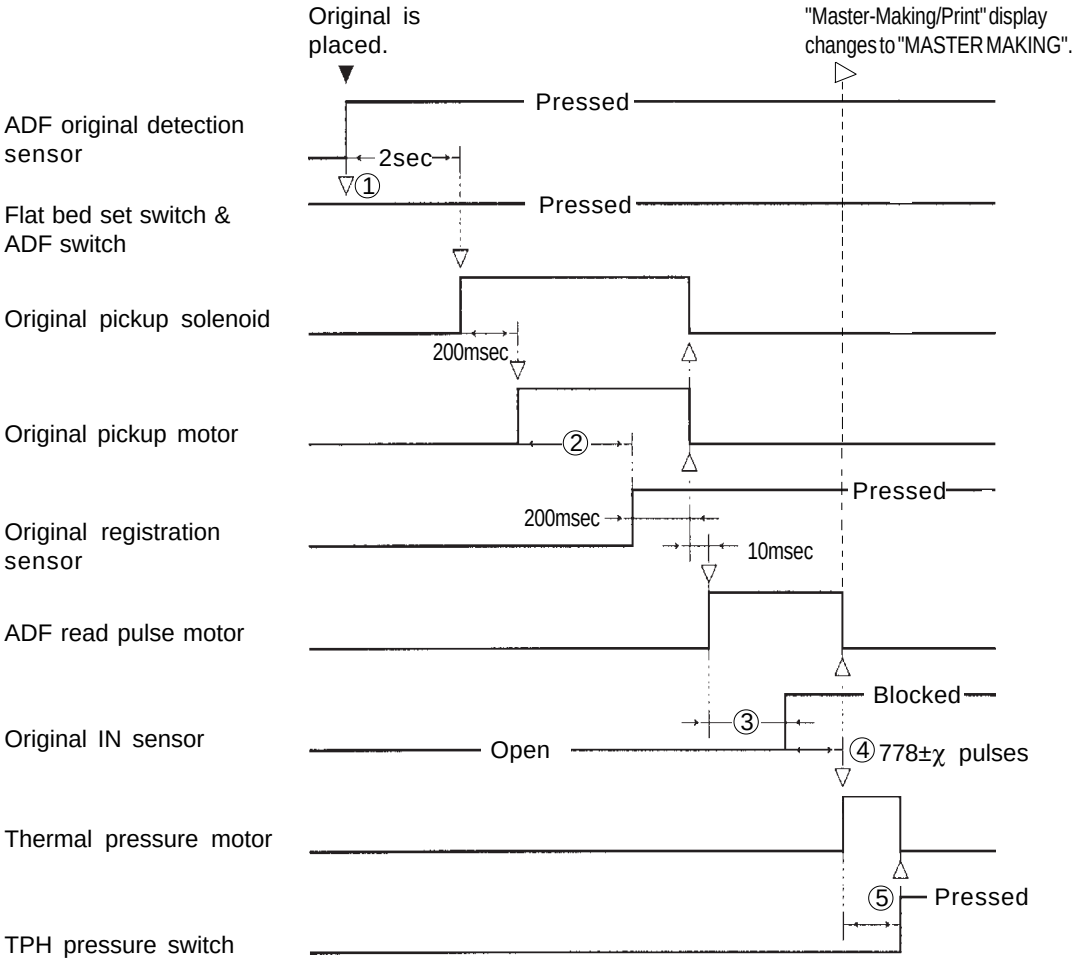
A: Original pickup solenoid
B: ADF pickup roller(upper)
C: Stripper pad
D: Tray spring
E: Stripper arm spring
F: ADF stripper roller(lower)
G: Original IN sensor
H: Original registration sensor
I: Original pickup motor
J: ADF gear
K: ADF switch
L: ADF original detection sensor
M: ADF stripper roller(upper)
N: ADF read pulse motor
O: ADF transfer roller





- Timing Chart -

ADF Original Loading System



① The Flat bed set switch and ADF switch should be actuated ON to activate the ADF original detection sensor.
② If the Original registration sensor has not detected an original **within 1.35 seconds** after the original pickup motor is activated, the machine assumes the original has misfed and displays the error message “ORIGINAL MISFEED OPEN ADF COVER AND RESET ORIGINAL”.
③ If the Original IN sensor has not detected an original **within 630 pulses** after the ADF read pulse motor is activated, the machine assumes the original has jammed at the ADF entrance and displays the error message “ORIGINAL JAM RESET ORIGINAL”.
④ The adjustment of "x" pulses is possible by using the Memory switch **No.218**.
⑤ If the TPH pressure switch has not been actuated ON **within 4 seconds** after the Thermal pressure motor is activated, the machine assumes that the Thermal pressure motor has been locked and displays the error message “T19 CALL SERVICE”.

2. ADF Image Scanning System - in Auto Scanning Contrast Adjustment Mode

- Shading Compensation

When the "START" button is pressed, after the original has been set in position, the LEDs of the Image Scanner are turned ON and the shading compensation is made.

200ms later, the Flat bed read pulse motor is activated, leading the Image scanner to the position for image scanning under the ADF unit.

- Reading (Detection) of Original Background Density [AUTO BASE CONTROL]

After the Image scanner slides out of the Image scanner ADF shading sensor, the Flat bed read pulse motor rotates **1811 pulses** more and then stops with the Image scanner positioned for image scanning.

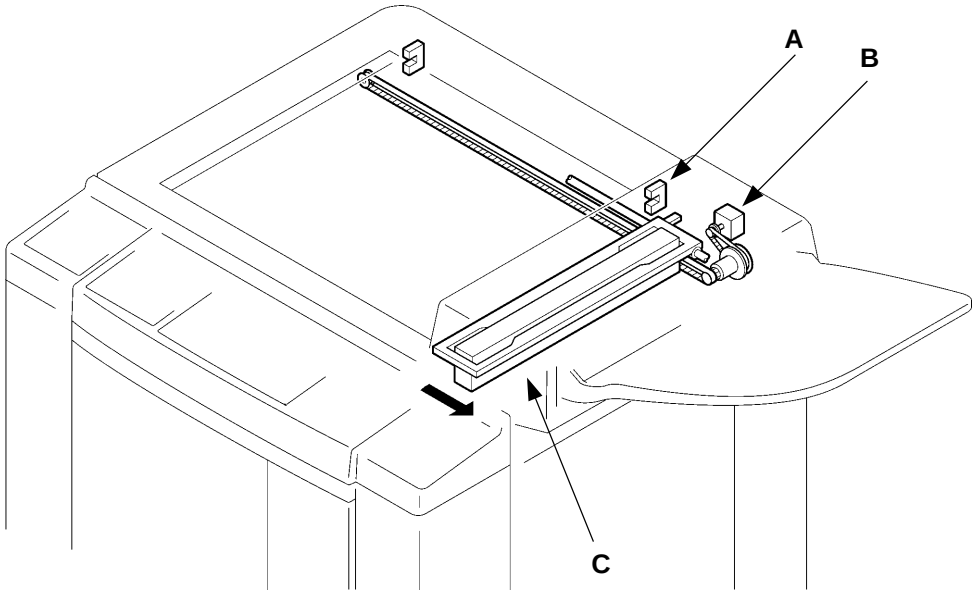
At the same time, the Auto base control data is cleared from the memory on the Image processing PCB and the Image scanner starts reading the original background density for the new Auto base control data.

- Start of Image Scanning

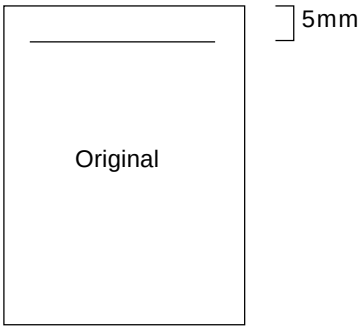
After the original background density data which has been read in are processed into the new Auto base control data, the FB-ADF read pulse motor is activated to feed the original and the Read & Write start signal is turned ON to start image scanning.

- Availability of Auto Scanning Contrast Adjustment Mode

The Auto scanning contrast adjustment mode is not available with the Photo mode, Duo mode or Dot photo mode.



A: Image scanner ADF shading sensor
B: Flat bed read pulse motor
C: Image scanner

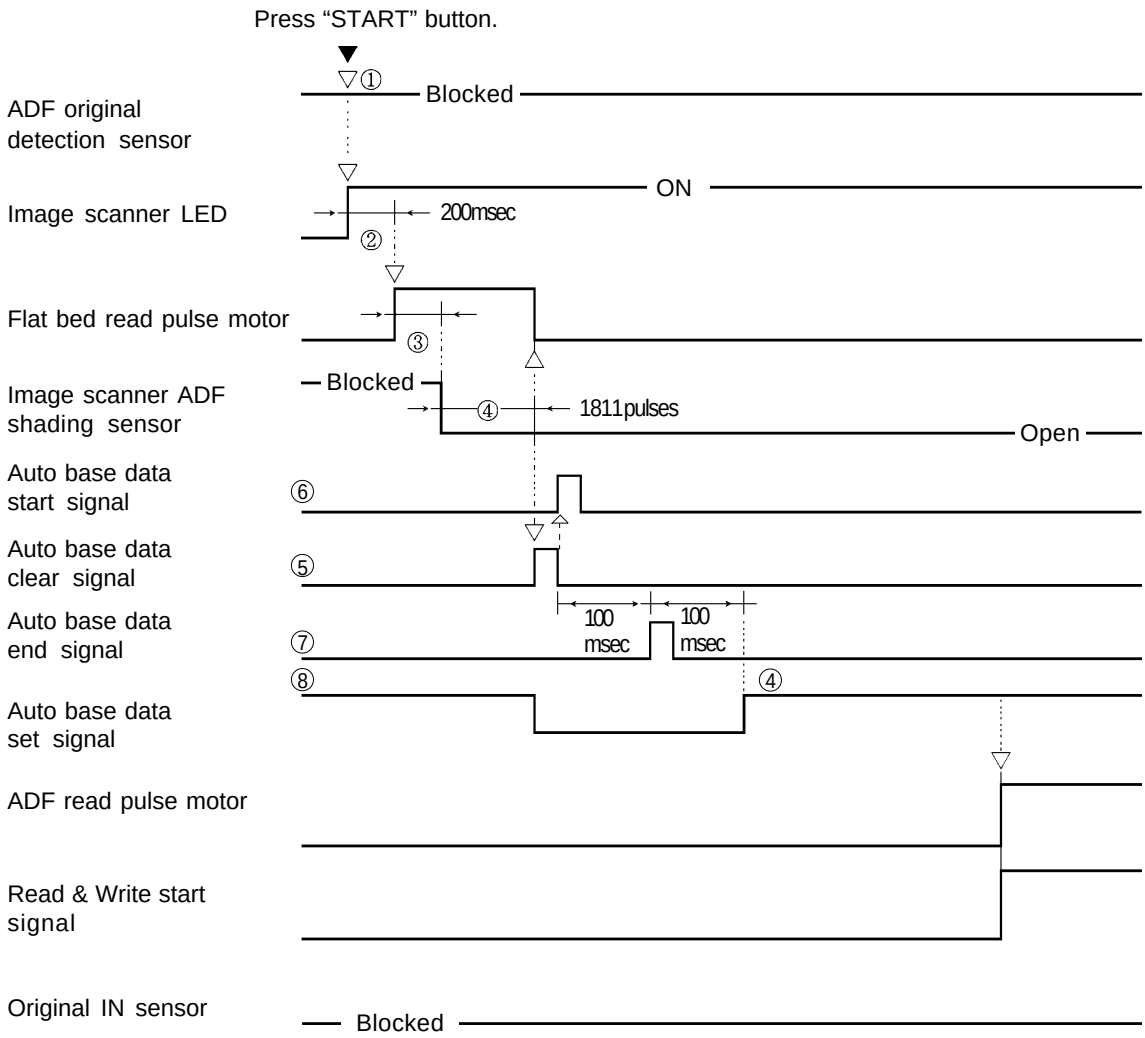


THEORY OF OPERATION

Test Mode No.50 Image scanner ADF shading sensor – Light up when light path is blocked
No.79 Image scanner LED lighting
No.108 Flat bed pulse motor continuous operation
No.113 ADF original feed operation

- Timing Chart -

ADF Image Scanning System - in Auto Scanning Contrast Adjustment Mode



① The "START" key cannot be activated until an original is completely loaded in the ADF.
② The shading compensation is made automatically when the LEDs of the Image scanner are turned ON.
③ If the Image scanner has not gone out of the Image scanner ADF shading sensor **within 314 pulses** after the Flat bed read pulse motor is activated, i.e. the light path of the sensor has not been opened, it is assumed that the Flat bed read pulse motor has been locked and the error message **"T15 CALL SERVICE"** is displayed on the operation panel.
④ If the Auto base data set signal has not been turned ON 100 msec after the Auto base data end signal is output, the error message **"T10 TURN MAIN POWER SW. OFF THEN ON"** is displayed on the operation panel.
⑤ If the Auto base data clear signal is turned on, the previous Auto base data will be cleared.
⑥ If the Auto base data start signal is turned on, the image data will be taken in by the image scanner.
⑦ The Auto base data end signal is to signal the end of taking in the image data.
⑧ The Auto base data set signal is turned on when the Auto base data is stored.

T10 (Image Processing PCB Failure)
• 2. Auto base data set signal not turned ON

ADF PCB Original IN sensor
– Light up when light path is blocked

3. ADF Image Scanning System

- Shading Compensation

When the "START" button is pressed, after the original has been set in position, the LEDs of the Image Scanner are turned ON and the shading compensation is made.

200ms later, the Flat bed read pulse motor is activated, leading the Image scanner to the position for image scanning under the ADF unit.

- Start of Scanning

After the Image scanner slides out of the Image scanner ADF shading sensor, the Flat bed read pulse motor rotates **1811 pulses** more and then stops with the Image scanner positioned for image scanning.

At the same time, the ADF read pulse motor is activated to feed the original by rotating the ADF transfer roller and ADF exit roller via pulleys and belt, and the Read & Write start signal is turned ON to start the scanning of the original.

- Finish of Scanning

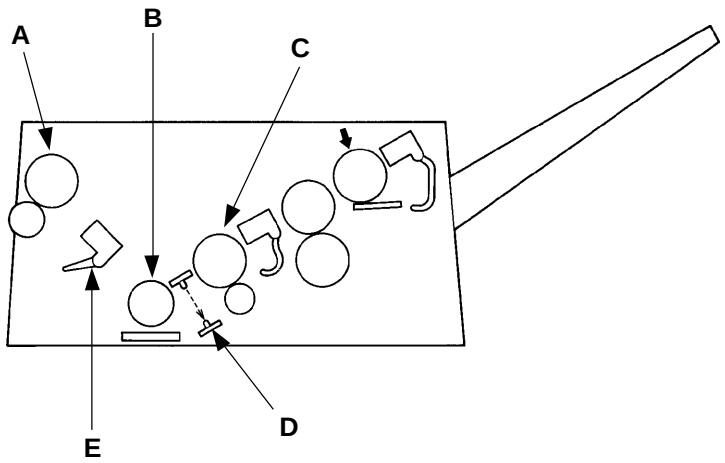
The original proceeding through the ADF unit opens the light path of the Original OUT sensor by pushing the actuator out of the sensor.

When the original advances further and its trailing edge passes through the Original IN sensor and opens its light path, **278 pulses** later, the Read & Write start signal is turned OFF to end the scanning of the original.

- Ejection of the Original

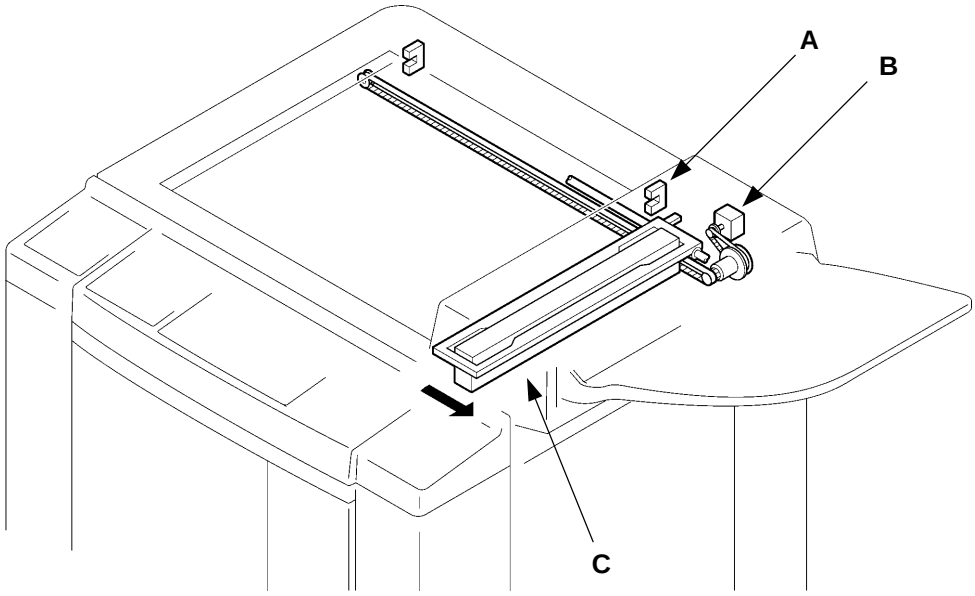
The ADF read pulse motor is rotated further for **3780 pulses** after the Read and Write start signal is turned OFF to finish the transportation of the original out of the ADF unit.

A: ADF exit roller
B: White roller
C: ADF transfer roller
D: Original IN sensor
E: Original OUT sensor

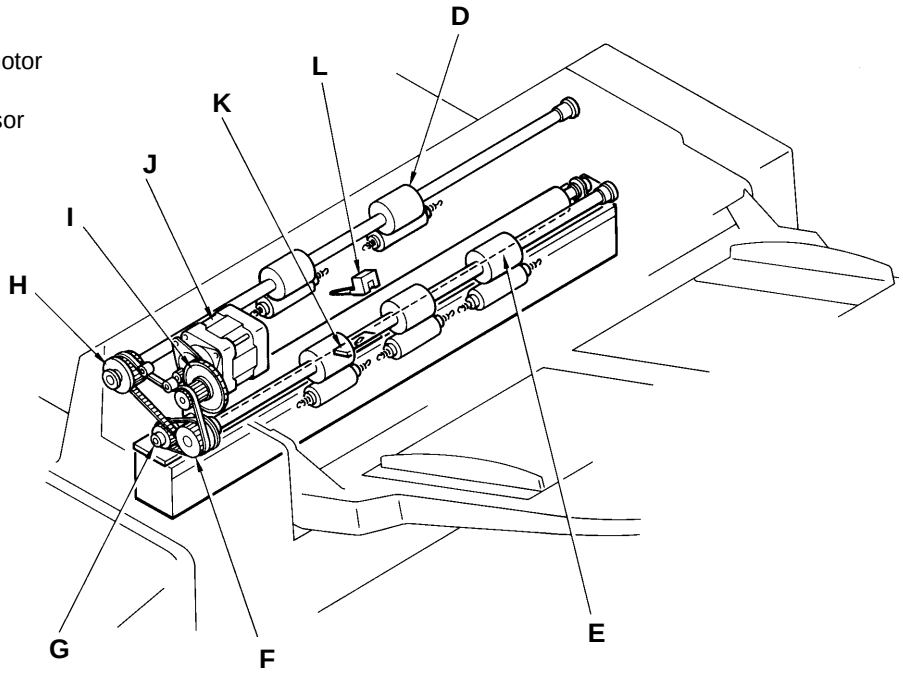


THEORY OF OPERATION

Test Mode No.36 Original IN sensor
– Short interval beeps when light path is blocked
No.45 Original OUT sensor
– Short interval beeps when pressed
No.50 Image scanner ADF shading sensor
– Short interval beeps when light path is blocked
No.79 Image scanner LED lighting
No.113 ADF original feed operation

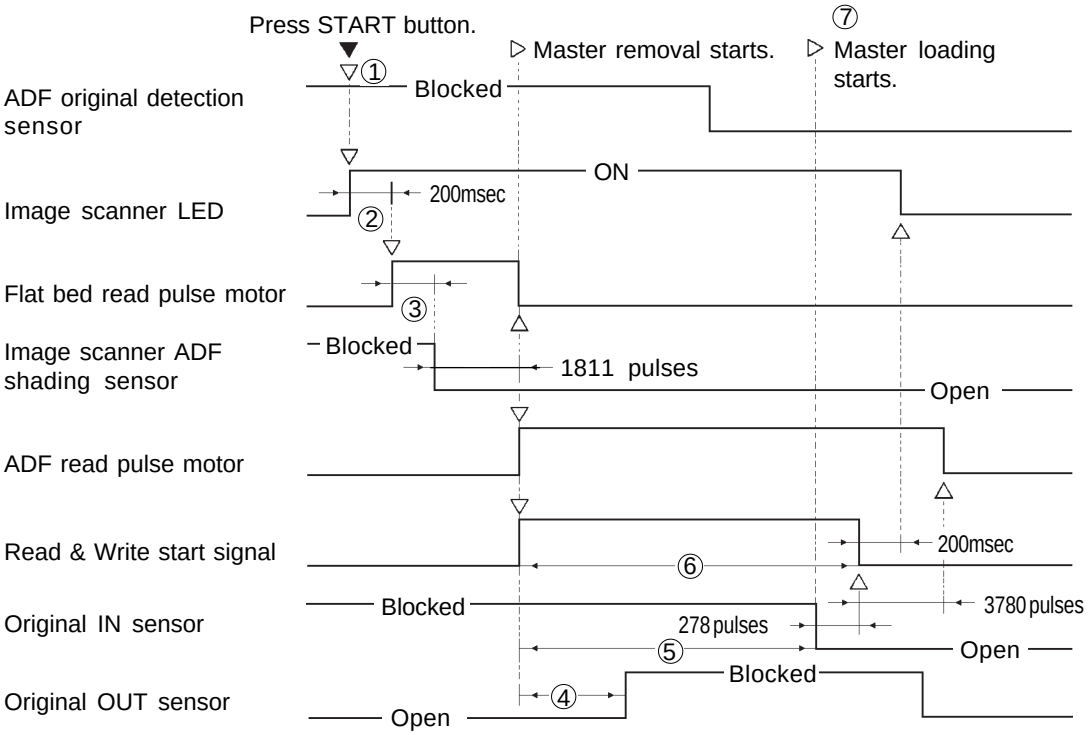


A: Image scanner ADF shading sensor
B: Flat bed read pulse motor
C: Image scanner
D: ADF exit roller
E: ADF transfer roller
F: Transfer roller pulley
G: Read roller pulley
H: ADF exit pulley
I: ADF main gear
J: ADF read pulse motor
K: Original IN sensor
L: Original OUT sensor



- Timing Chart -

ADF Image Scanning System



① The "START" button cannot be activated until an original is completely loaded in the ADF.
② The shading compensation starts when the LED arrays of the Image scanner are turned ON.
③ If the Image scanner has not slided out of the Image scanner ADF shading sensor **within 314 pulses** after the Flat bed read pulse motor is activated, it is assumed that Flat bed read pulse motor has been locked and the error code **[T 15]** is displayed on the operation panel.
④ If the Original OUT sensor has not detected an original **within 1890 pulses** after the ADF read pulse motor is activated, it is assumed that the original has jammed at the exit of ADF and the error message “ORIGINAL JAM RESET ORIGINAL” is displayed on the operation panel**.**
⑤ If the Original IN sensor keeps detecting an original **for 14803 pulses** after the ADF read pulse motor was activated, the machine assumes the original has jammed or is oversized and indicates the error message “ORIGINAL JAM REMOVE ORIGINAL” on the operation panel.
⑥ The Read & Write start signal is turned OFF **278 pulses** after the trailing edge of the original clears out of the Original IN sensor, or when the Write pulse motor has rotated for the size of paper on the Paper feed tray.
⑦ When the trailing edge of the original clears out of the Original IN sensor, a new-made master starts to be loaded on the Drum after confirming that a used master is completely removed from the Drum.
If the Read & Write start signal is turned OFF before the original clears out of the Original IN sensor, the new-made master starts to be loaded on the Drum at that time.

ADF PCB LED D6(IN) Original IN sensor
– Light up when light path is blocked
Test Mode No.36 Original IN sensor
– Short interval beeps when light path is blocked
No.46 ADF SW
– Short interval beeps when pressed

REMOVAL & ASSEMBLY

1. ADF Glass, ADF Original IN Sensor (receive), ADF Switch, White Roller

< Removal Procedure >

ADF Glass

1. Turn OFF the power and remove the FB-ADF unit from the machine.
2. Remove the mounting screws on the Image scanner glass holders (L) and (R), and remove the holders.
3. Take out the ADF glass carefully.

ADF Original IN Sensor (receive)

2. Unplug the connector of the ADF original IN sensor (receive).
3. Remove the mounting screw of the ADF original IN sensor (receive), and remove the sensor from the ADF unit, peeling off the tape securing the wires of the sensor.

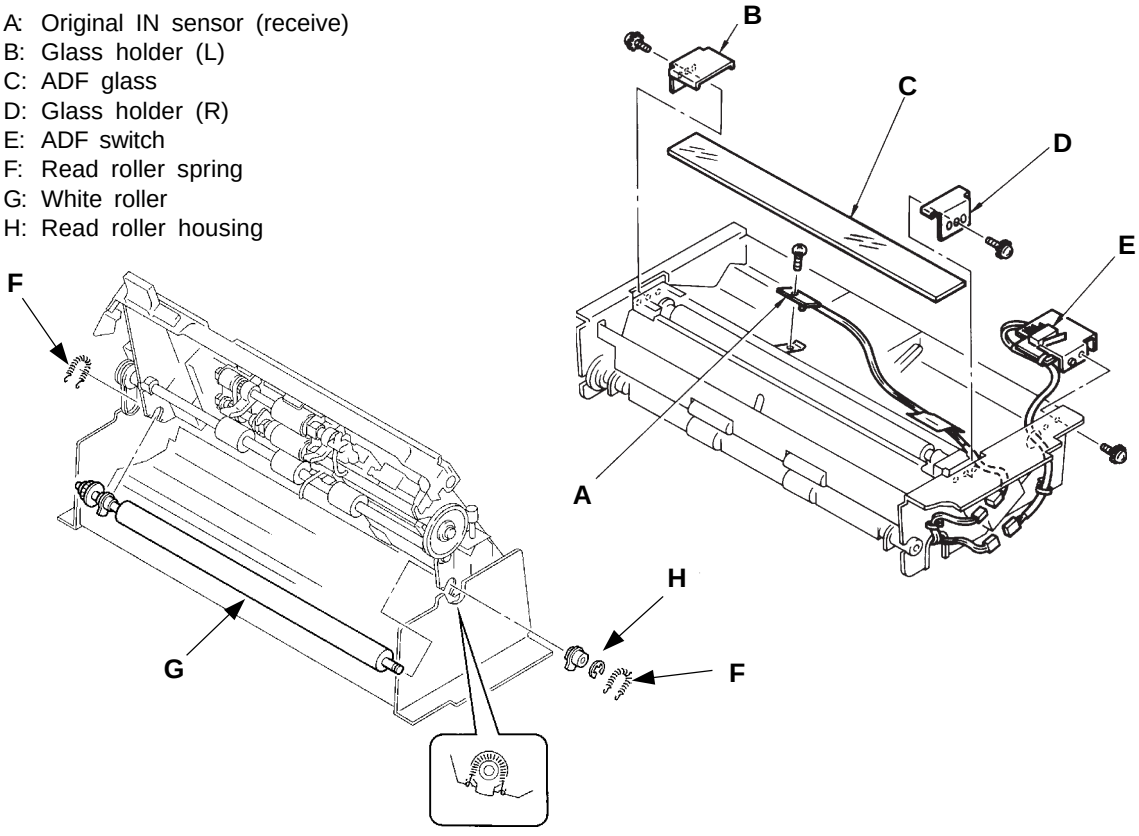
ADF Switch

2. Unplug the connector of the ADF switch and cut the wire clamper securing the wires of the switch.
3. Remove the mounting screw of the ADF switch bracket, and remove the bracket with the switch.

White Roller

2. Remove the two Read roller springs from both ends of the shaft.
3. Remove an E ring on end of the shaft and remove the Read roller housing.
4. Push the white roller to the left to disengage it from the ADF unit.

A: Original IN sensor (receive)
B: Glass holder (L)
C: ADF glass
D: Glass holder (R)
E: ADF switch
F: Read roller spring
G: White roller
H: Read roller housing



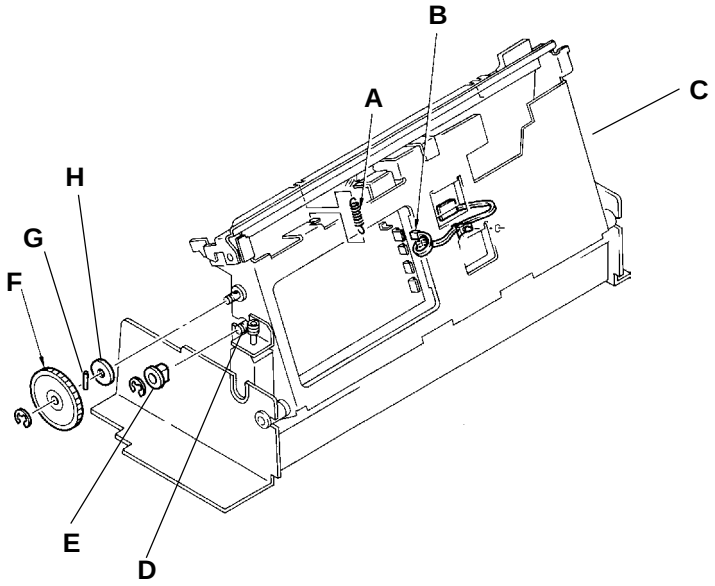
ADF PCB LED D6(IN) Original IN sensor
– Light up when light path is blocked
Test Mode No.36 Original IN sensor
– Short interval beeps when light path is blocked

2. Original IN Sensor (send), ADF Transfer Roller, Original Pickup solenoid

< Removal Procedure >

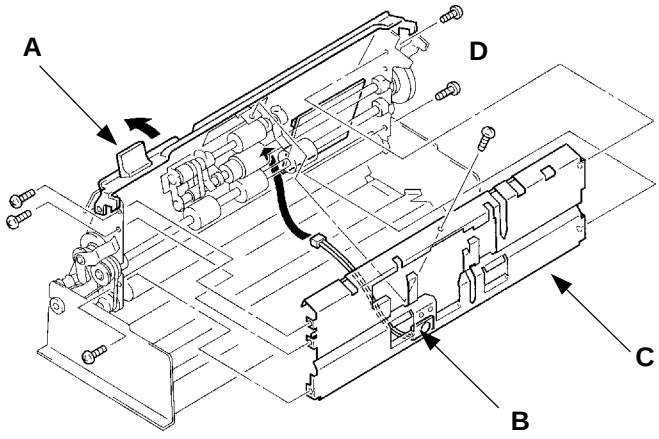
1. Turn OFF the power, and remove the ADF cover.
2. Remove the Open lever spring.
3. Unplug the connector of the Original IN sensor from CN8 of the ADF PCB and pinch the Wire harness band with a pair of pliers and push it off from the ADF upper frame.
4. Remove an E ring on the ADF gear and slide out the ADF gear, Parallel pin and Spacer.
   [IMPORTANT]
   Don't drop the parallel pin when removing the ADF gear because it will be freed.
5. Remove an E ring from the ADF transfer roller and slide out the Metal.

A: Open lever spring
B: Connector
C: ADF upper frame
D: ADF transfer roller
E: Metal
F: ADF gear
G: Parallel pin
H: Spacer



Original IN Sensor (send)

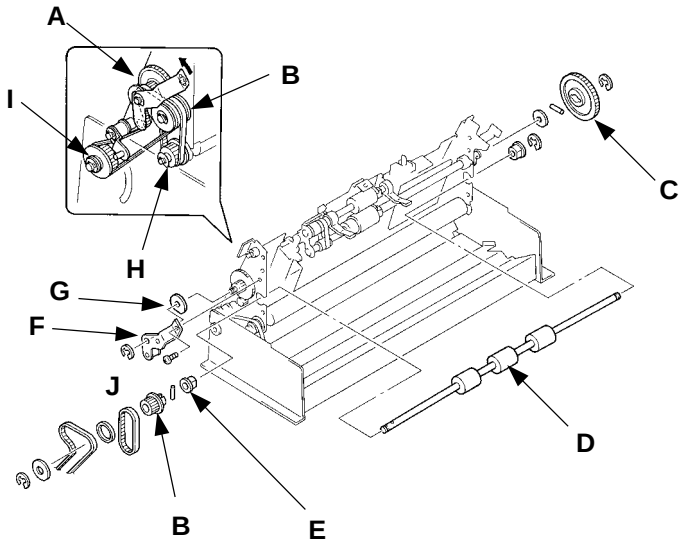
6. Remove six mounting screws on the ADF original guide (F) and remove the guide with the Original IN sensor attached.



A: ADF open lever
B: Original IN sensor
C: ADF original guide (F)
D: Bind-head IB Lock Screw M3x6

ADF Transfer Roller

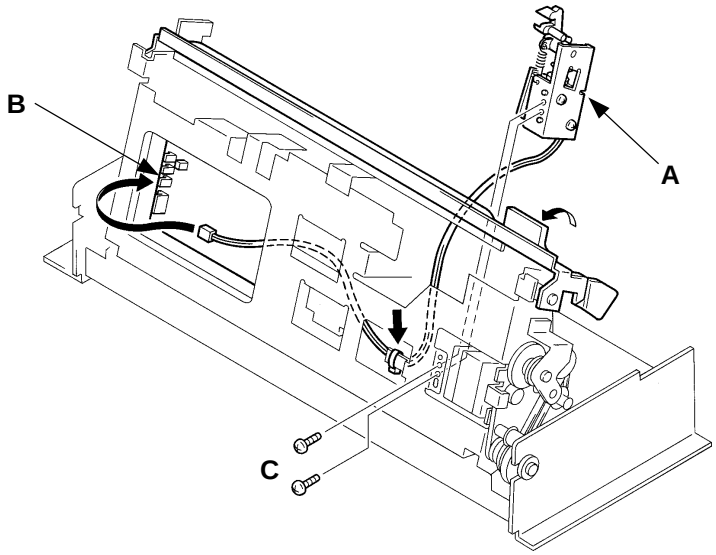
7. Remove the mounting screw and an E ring on the ADF tension plate, and remove the ADF tension plate and disengage the belt.
8. Remove an E ring on the ADF transfer roller and remove the Transfer roller pulley while disengaging the belt, and remove the Parallel pin and Plastic collar to free the ADF transfer roller from the ADF unit.
   [IMPORTANT]
   Don't drop the parallel pin when removing the ADF gear because it will be freed.



A: Main gear
B: Transfer roller pulley
C: ADF gear
D: ADF transfer roller
E: Plastic collar
F: ADF tension plate
G: Main gear spacer
H: Read roller pulley
I: Exit pulley
J: Pan-head Screw SW

Original Pickup Solenoid

9. Unplug the connector of the Original pickup solenoid from CN2 of the ADF PCB and remove two mounting screws on the solenoid.



A: Original pickup solenoid
B: CN2
C: Bind-head IB Lock Screw M3x6

Test Mode No.34 ADF Original detection sensor
– Short interval beeps when pressed
No.35 Original registration sensor
– Short interval beeps when pressed

3. ADF Original Detection Sensor, Original Registration Sensor

< Removal Procedure >

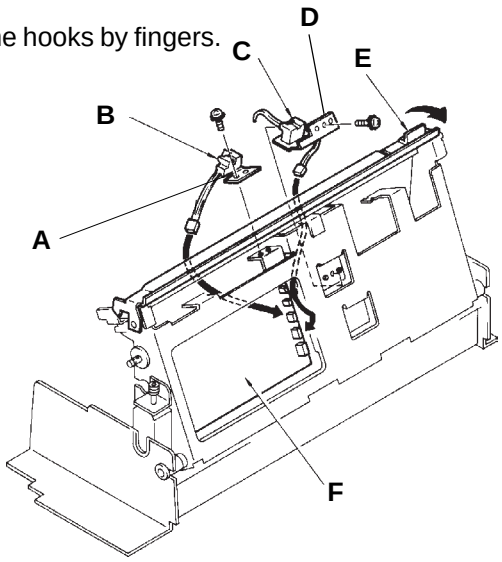
ADF Original Detection Sensor

1. Remove the FB-ADF original guide (F).
2. Unplug the Connector from CN9 of the ADF PCB.
3. Remove the mounting screw on the Original detection sensor bracket and lift the ADF open lever.
4. Remove the Original detection sensor bracket with the sensor from the ADF unit.

Original Registration Sensor

1. Unplug the Connector from CN10 of the ADF PCB.
2. Remove the mounting screw on the Original registration sensor bracket and remove the bracket with the sensor from the ADF unit.
3. Separate the sensor from the bracket by pinching the hooks by fingers.

A: Original detection sensor bracket
B: ADF original detection sensor
C: Original registration sensor
D: Registration sensor bracket
E: ADF open lever
F: ADF PCB

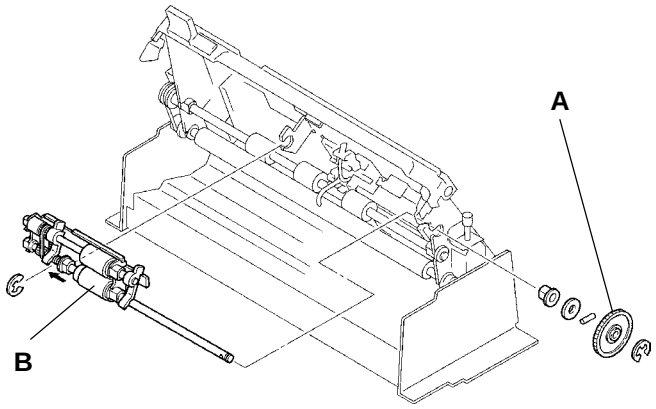


4. ADF Pickup (Upper) Ass'y, ADF Stripper Ass'y

<Removal Procedure>

ADF Pickup (Upper) Ass'y

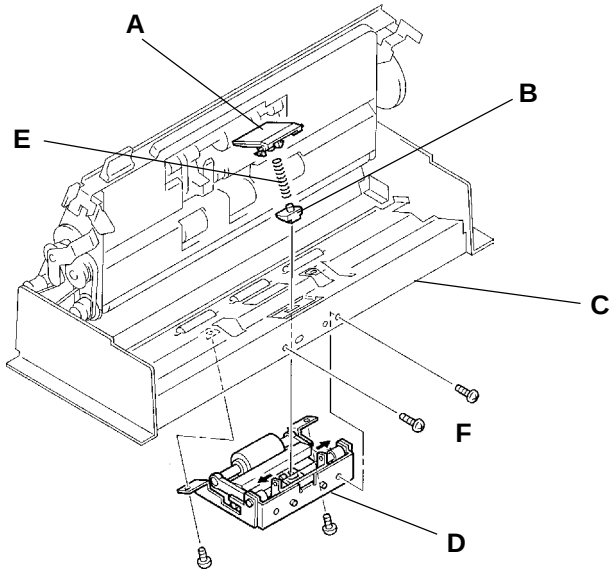
1. Remove the ADF original guide (F).
2. Remove the ADF original detection sensor.
3. Remove an E ring on the right side of the ADF pickup (upper) ass'y.
4. Slide and remove the ADF pickup ass'y to the left.



A: ADF gear
B: ADF pickup (upper) Ass'y

ADF Stripper Ass'y

1. Remove four mounting screws on the ADF stripper ass'y and remove it from the ADF lower frame.



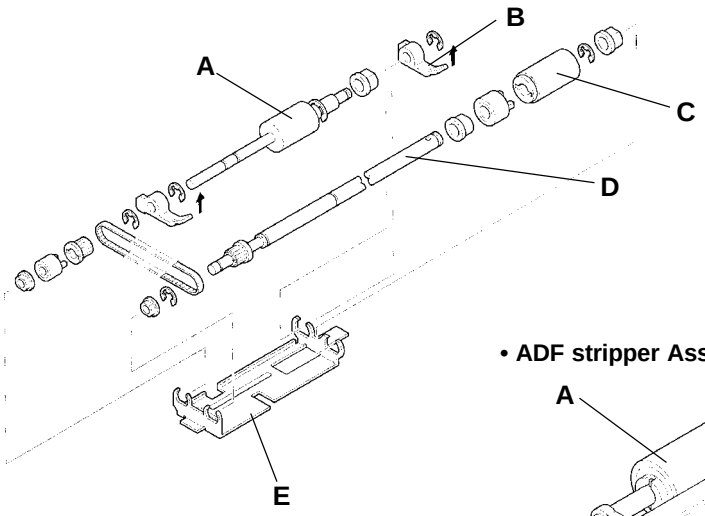
A: Stripper pad
B: Tray push
C: ADF lower frame
D: ADF stripper Ass'y
E: Tray spring
F: Bind-head IB Lock Screw M3x6

Disassembly of ADF Pickup (upper) Ass'y, ADF stripper Ass'y

< Disassembly >

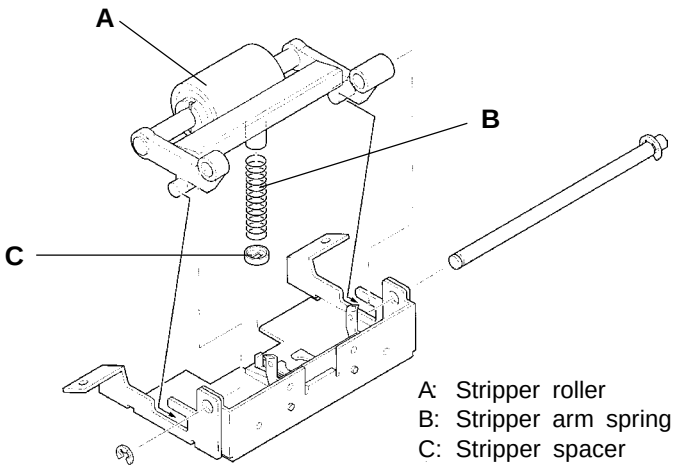
1. Disassembly and reassembly the these ass'y, showing the illustration below.

• ADF Pickup (upper) Ass'y



A: ADF Pickup roller
B: Lever shutter
C: ADF stripper roller
D: Stripper roller shaft
E: Pickup roller frame

• ADF stripper Ass'y



A: Stripper roller
B: Stripper arm spring
C: Stripper spacer

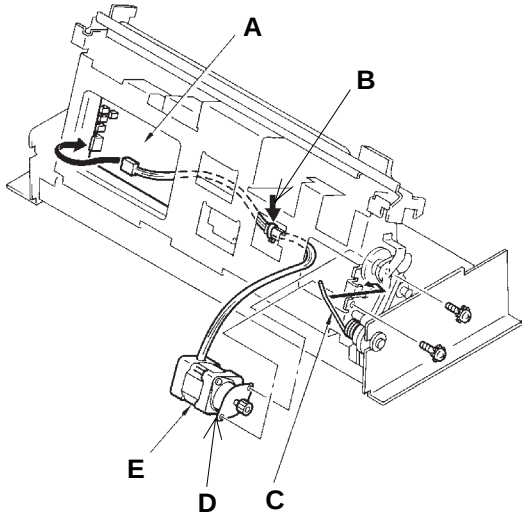
Test Mode No.45 Original OUT sensor
– Short interval beeps when pressed
No.78 Original pickup motor

5. ADF Read Pulse Motor

< Removal Procedure >

1. Turn OFF the power, and remove the ADF cover .
2. Unplug the connector of the ADF read pulse motor from CN1 of the ADF PCB and cut the Wire harness band to free the motor cord from the ADF unit.
3. Unhook the ADF spring (L) from the ADF upper frame.
4. Remove the two mounting screws on the ADF read pulse motor mount, and remove the motor with the mount from the ADF unit.

A: ADF PCB
B: Wire harness band
C: ADF spring (L)
D: Read pulse motor mount
E: ADF read pulse motor



6. Original Pickup Motor, Original OUT Sensor

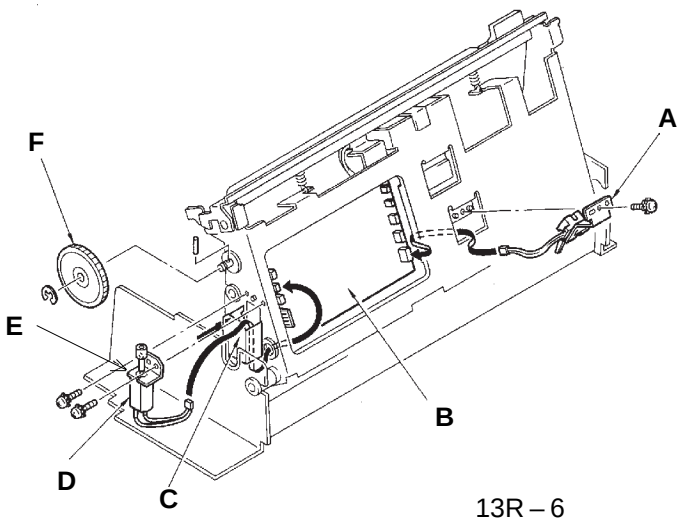
< Removal Procedure >

ADF Motor

1. Turn OFF the power, and remove the ADF cover .
2. Unhook the E ring and being careful not to misplace the parallel pin, remove the ADF gear.
3. Loosen the mounting screw of the Original pickup motor cover.
4. Remove the two mounting screws of the Motor bracket and unplug the Connector from CN3 of the ADF PCB.
5. Remove the Original pickup motor together with the bracket.

Original OUT Sensor

2. Remove the mounting screw of the Original OUT sensor bracket.
3. Unplug the Connector of the Original OUT sensor from CN11 of the ADF PCB and remove the sensor from the FB-ADF unit, together with the bracket.



A: Original OUT sensor bracket
B: ADF PCB
C: Original pickup motor cover
D: Original pickup motor
E: Original pickup motor bracket
F: ADF gear

ADJUSTMENT

ADF PCB LED D6(IN) Original IN sensor
– Light up when light path is blocked
Test Mode No.36 Original IN sensor
– Short interval beeps when light path is blocked

ADJUSTMENT

1. Sensitivity of Original IN Sensor

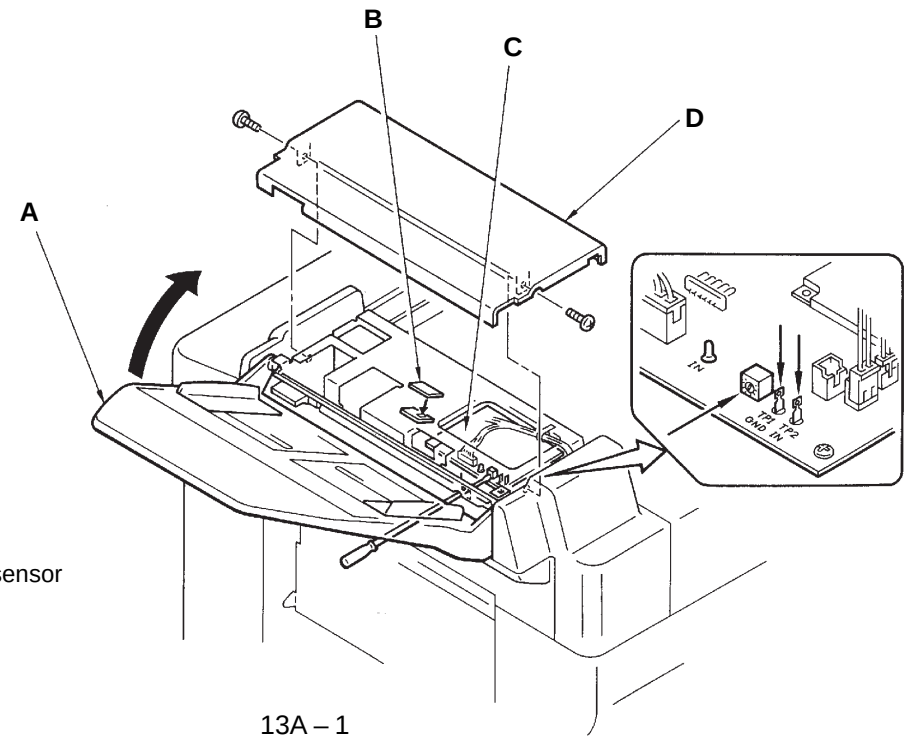
1. Turn OFF the power and remove the ADF Cover.
2. Connect a voltage meter between **TP1 (IN)** and **TP(2) (GND)** on the ADF PCB.
3. Turn ON the power and place a white sheet of paper in the light path of the Original IN sensor. The voltage should read **1.0±0.2** volts with a sheet of paper, and more than **3.0 volts** without (the light path of the Original IN Sensor not blocked).
4. If the above voltages are not obtained, adjust the sensitivity of the sensor by turning **VR1** on the ADF PCB.
   [Note]
   Turn the VR1 clockwise to increase the sensitivity of the sensor (the voltage increases).

- Check -

- Check the LED "**IN**" on the ADF PCB.
  Confirm that it illuminates when the light path of the Original IN sensor is blocked (a sheet of paper is inserted), and goes out when the sensor's light path is open (a sheet of paper is not inserted).

- Result of Misadjustment -

- If the sensitivity of the sensor is too high;
  The Original IN sensor cannot detect the original fed to the Image scanner even if the original is actually fed, and it is determined that the original has jammed before the Image scanner.
  As a result, the original jam error message "ORIGINAL JAM RESET ORIGINAL" will be displayed.
- If the sensitivity of the sensor is too low;
  It is determined that an original has already jammed before master making and the original jam error message "ORIGINAL JAM RESET ORIGINAL" will be displayed.



A: Original tray
B: Original IN sensor
C: ADF PCB
D: ADF cover

2. Scanning Start Position

When using ADF Unit for the Scanning

1. Using an original with continuous image from the top (original without white margin on the top), make a master through the ADF Unit, and make a print.
2. Check the print and confirm that the top **5±2mm** of the measure is erased on the print.
3. If more or less is erased, use Memory SW **No.218** to make the correction.
4. Press the PRINT POSITION button to select a Memory switch setting referring to the chart below.
   For instance, if Memory switch setting number **9** needs to be selected, press the PRINT POSITION button to move the number up or down until the display shows **9 218**.
5. Press the **STOP** button and then the **ALL RESET** button to input the selected number.
   The panel display returns to an ordinary indication.

- Precautions in Adjustment -

- The once-input Memory switch setting cannot be erased even if Test mode No.90 or 97 is activated or when System ROM is replaced.
- The Memory switch setting is erased when **System PCB** is replaced or when Test mode **No.98** is applied.
  In this case all other Memory switch settings will also be erased.

SW Setting	9	A	B	C	D	E	F	O
Amount (mm)	-2.8	-2.4	-2.0	-1.6	-1.2	-0.8	-0.4	0
SW Setting	1	2	3	4	5	6	7	8
Amount (mm)	+0.4	+0.8	+1.2	+1.6	+2.0	+2.4	+2.8	+3.2

Decrease ◄——— Skip Amount ———► Increase

3. Horizontal Scanning Position

- When using ADF Unit for Scanning

1. Make a master at **[1:1]** size using **Test chart** through the ADF Unit.
2. Check if all "e" marks on both sides of the test chart original appear on the master on the Drum.
3. If not, adjust the horizontal scanning position by Memory SW **No.217**, referring to the chart below.

[IMPORTANT]

If "e" marks on both sides are missing in a large area, check the installation position of the **Paper size potentiometer** under the Paper feed tray, and the **Master making width adjustmen**t.

- Precautions in Adjustment -

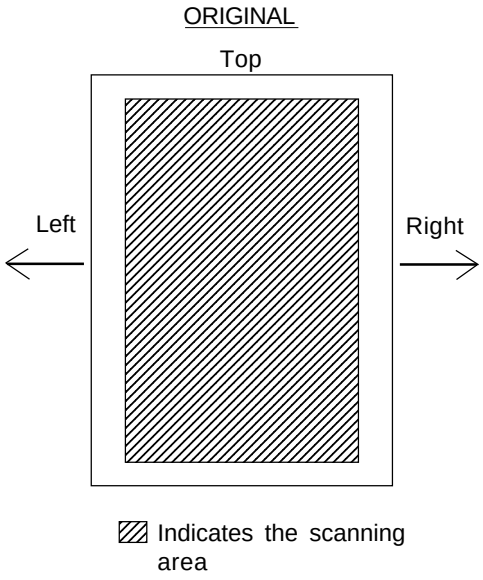
- The once-input Memory switch setting cannot be erased even if Test mode No.90 or 97 is activated or when System ROM is replaced.
- The Memory switch setting is erased when **System PCB** is replaced or when Test mode **No.98** is applied.
  In this case all other Memory switch settings which have been input will also be erased.

Memory SW No.217

SW setting	Amount (mm)
9	-3.5
A	-3.0
B	-2.5
C	-2.0
D	-1.5
E	-1.0
F	-0.5
0	0
1	+0.5
2	+1.0
3	+1.5
4	+2.0
5	+2.5
6	+3.0
7	+3.5
8	+4.0

The scanning area slides to the left.

The scanning area slides to the right.



4. Image Elongation/Shrinkage Correction

- When using ADF unit for Scanning (ADF Read pulse motor speed adjustment).

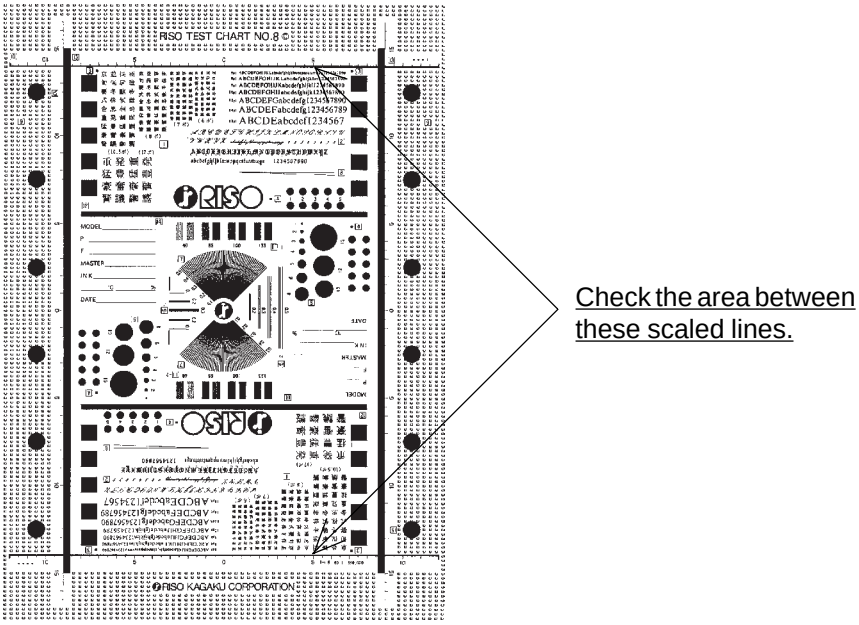
1. Make a master at **[1:1]** size using **Test chart** through the ADF Unit and make prints.
2. Compare printouts with the test chart original.
   Check that the difference in image size is **within 4mm** in the area between the top and bottom scaled lines, between the printouts and the test chart original.
3. If it is elongated or shrunk **by 4mm or more**, compared to the original size, select the Memory SW No. 216 and use the PRINT POSITION Key on the operation panel to select a desired Memory SW setting number, referring to the chart below.
   [IMPORTANT]
   Be sure to turn OFF the machine each time the Hex SW is turned to update the memory.

SW Setting	9	A	B	C	D	E	F	O
Amount (mm)	-7	-6	-5	-4	-3	-2	-1	0
SW Setting	1	2	3	4	5	6	7	8
Amount (mm)	+1	+2	+3	+4	+5	+6	+7	+8

◄——— Expansion Amount ———►

- Precautions in Adjustment -

- There may be more than one reason for elongation or shrinkage of printed image.
  Mechanical causes, i.e. backward tension on the master roll, wear of the White roller, loose screw in the pulleys, etc. should also be checked.



[Test Chart]

CHAPTER 14: CUTTER SECTION

Contents

THEORY OF OPERATION
1. Master Cutting System 14T-1

REMOVAL & ASSEMBLY
1. Cutter Unit 14R-1
2. Master Positioning Sensor 14R-2

THEORY OF OPERATION

1. Master Cutting System

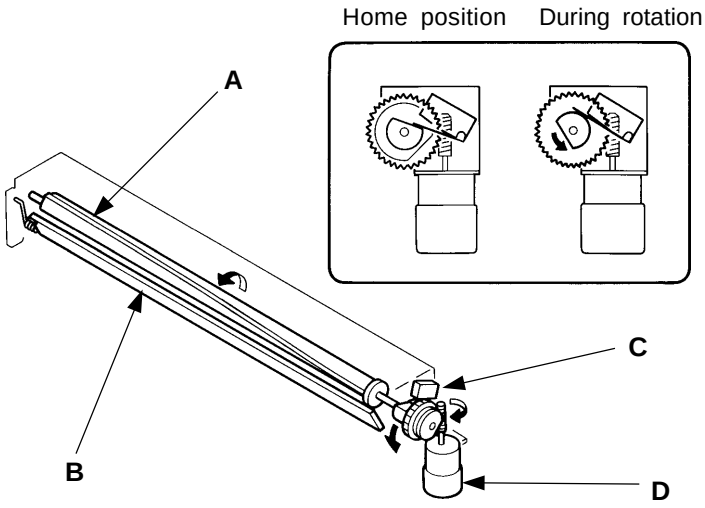
- Basic

The Cutter operates in the following cases.

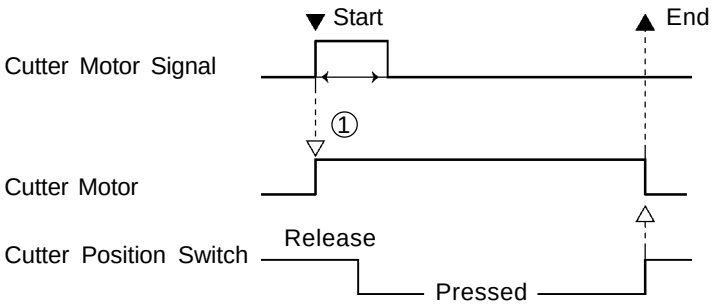
- When the Drum is rotated to the Position C-2 during loading master on the Drum.
- When the Master positioning sensor detects master material at the time the Master loading unit is opened and closed.
- When the Master loading button is pressed with master material already loaded.

The upper Cutter blade is rotated by the Cutter motor via the Cutter gear.The Cutter motor starts to rotate, the actuator of the Cutter position SW is pressed by the high part of the cam and the motor keeps rotating while the actuator of the switch is pressed.

A: Upper blade
B: Lower blade
C: Cutter position switch
D: Cutter motor



Cutter Timing Chart



① If the cutter motor signal is turned on, the cutter motor will be turned on.

MEMO

REMOVAL & ASSEMBLY

1. Cutter Unit

< Removal Procedure >

1. Pull out the Drum, turn OFF the power and remove the Back cover.
2. Open the Scanner table.
3. Remove two mounting screws on the Aero guide sheet and remove the sheet.
4. Remove two mounting screws on the Set sheet plate and remove the plate.
5. Disconnect the connector of the Master positioning sensor.
6. Disconnect the connectors of the Cutter motor and Cutter position switch.
7. Remove two mounting screws of the Cutter unit and take out the unit from the opening for the Drum replacement, holding it from underneath.

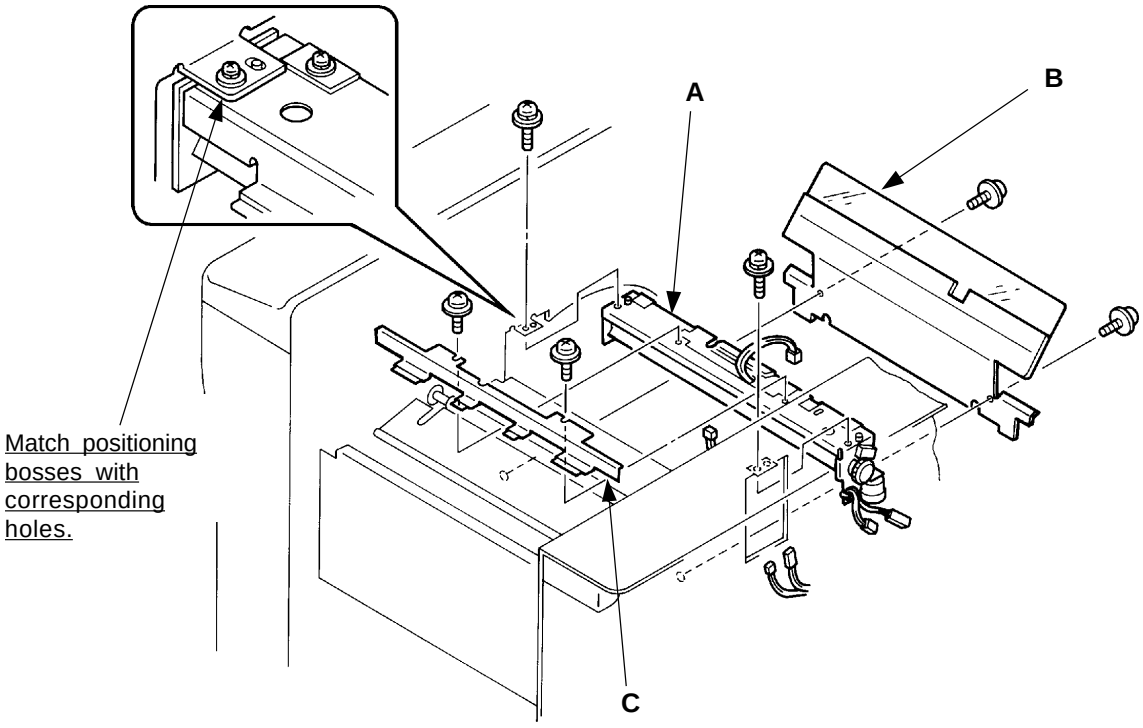
- Precautions in Assembly -

- Be sure to use M4x6 double-washer screws when securing the Cutter unit.
  If longer screws are used, they get contact with the upper Cutter blade and lock it.
- When mounting the Cutter unit back in the machine, make sure to match the respective positioning bosses on the Cutter unit with the corresponding holes of the mounting brackets. Otherwise, master wrinkles will occur in loading a master on the Drum.

- Checking after Assembly -

- After installing the Cutter unit, make sure that the upper Cutter blade moves smoothly with Test mode **No.112**, before setting master.

A: Cutter unit
B: Aero guide sheet
C: Set sheet plate



LED WAIT Master positioning sensor
– Light up when reflected light not detected
Test Mode No.15 Master positioning sensor
– Short interval beeps when reflected light is detected

2. Master Positioning Sensor

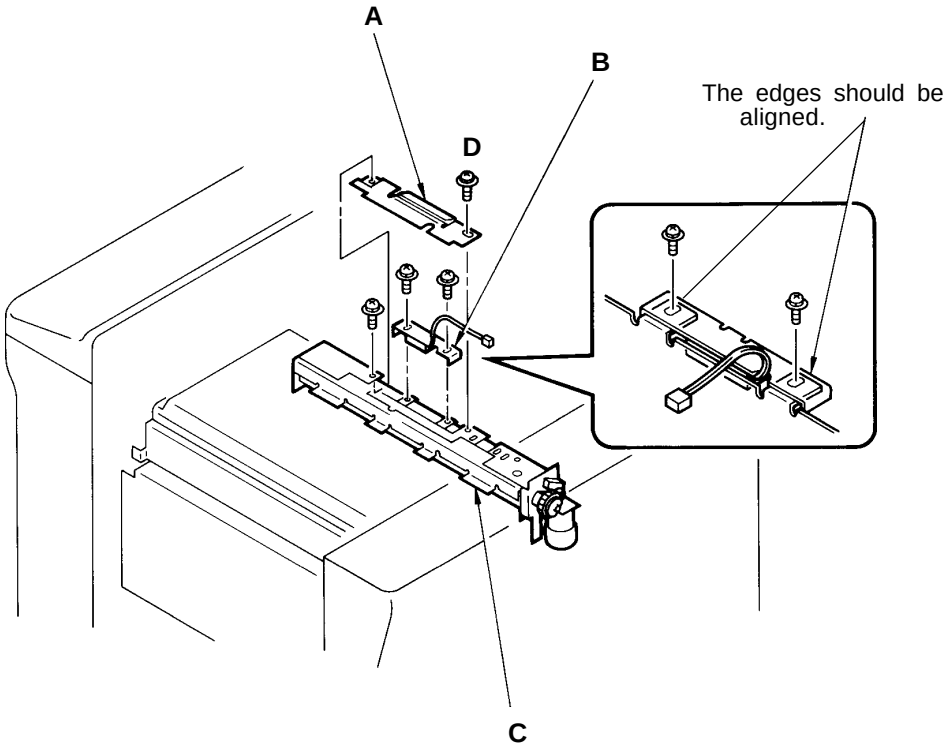
< Removal Procedure >

1. Turn OFF the power and open the Scanner table.
2. Disconnect the connector of the Master positioning sensor.
3. Remove two mounting screws on the Master guide stopper plate and remove the plate.
4. Remove two mounting screws on the Master positioning sensor and remove the sensor.

- Precautions in Assembly -

- Align the side edge of the Master positioning sensor with the front edges of the mounting plates on the Cutter unit.
  If the mounting position of the Master positioning sensor is changed, the length of master which is to be caught by the Clamp plate will be changed accordingly.

A: Master guide stopper plate
B: Master positioning sensor
C: Cutter unit
D: Pan-head Screw SW.W M3x6



CHAPTER 15: MASTER SETTING SECTION

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2. Thermal Pressure Motor Unit 15R-2
3. Thermal Pressure Motor 15R-3

THEORY OF OPERATION

1. Thermal Print Head Positioning System

- Basic

The Thermal print head is lowered and raised by the rotation of the Thermal pressure motor.

- Lowering of Thermal Print Head

The Thermal pressure motor rotates until the TPH pressure switch has been actuated ON by the Sw cam, to lower the Thermal print head to the ready position.

- Pressing of Thermal Print Head on Write Roller

The lowered Thermal print head is pressed on the Write roller, with master material between, by the TPH pressure springs via the Pressure assist plates on both sides.

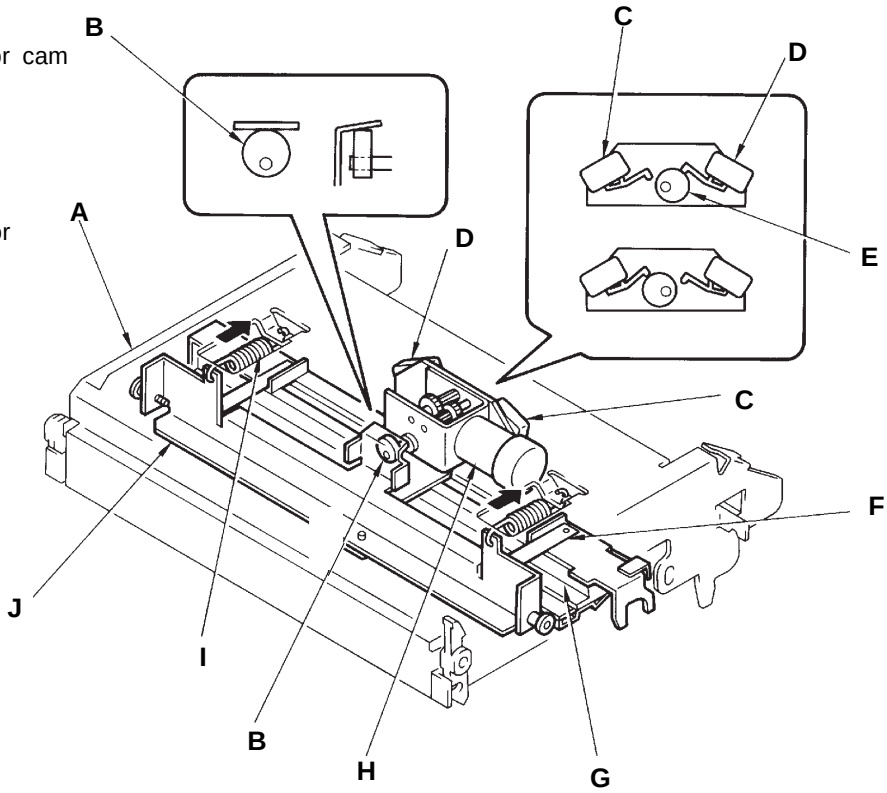
The Pressure assist plates are pushed down by the TPH bracket, which is pulled by the TPH pressure springs to make the Thermal print head pressed down.

- Retreat of Thermal Print Head

The Thermal pressure motor rotates in reverse until the TPH home position switch has been actuated ON by the Sw cam, to raise the Thermal print head to the home (retreat) position by the Thermal pressure motor cam.

In this condition, the Thermal print head is separated from the Write roller.

A: Master loading unit
B: Thermal pressure motor cam
C: TPH pressure sw
D: TPH home position sw
E: Sw cam
F: Pressure assist plate
G: Thermal print head
H: Thermal pressure motor
I : TPH pressure spring
J : TPH bracket

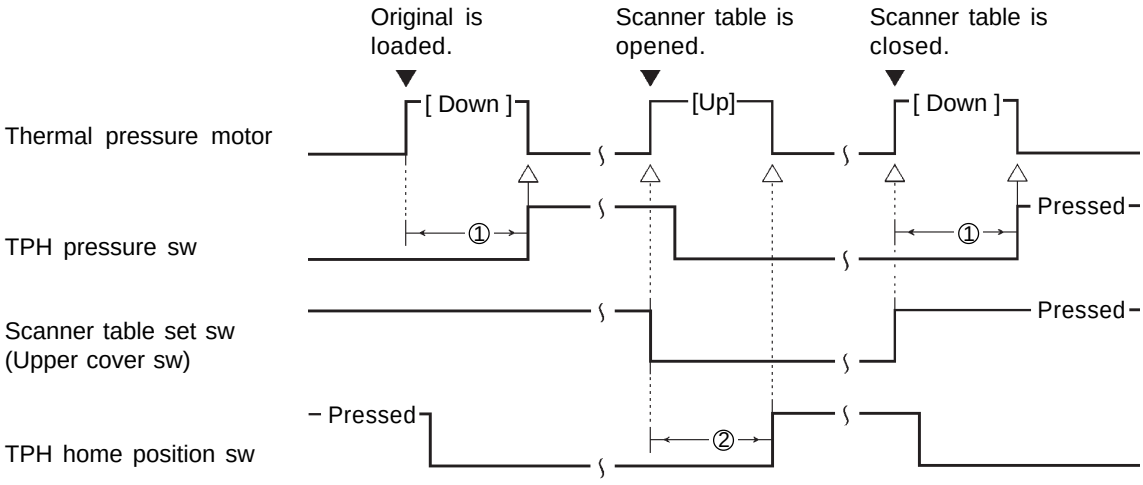


THEORY OF OPERATION

Test Mode No.31 TPH home position SW
– Short interval beeps when pressed
No.32 TPH pressure SW
– Short interval beeps when pressed
No.111 Thermal pressure motor operation

- Timing Chart -

Thermal Print Head Positioning System



① If the TPH pressure sw has not been pressed ON **within 4 seconds** after the Thermal pressure motor starts to rotate, the machine assumes that the Thermal pressure motor has been locked and displays the error code **[T 19]**.

② If the TPH home position sw has not been pressed ON **within 4 seconds** after the Thermal pressure motor starts to rotate, the machine assumes that the TPH pressure motor has been locked and displays the error code **[T 19]**.

T19 (Thermal Pressure Motor Lock)
• Thermal pressure SW not turned ON • Thermal home position SW not turned ON

LED WAIT Master positioning sensor
– Light up when reflected light not detected
MDTC Master detection sensor
– Light up when reflected light not detected
MEND Master end sensor
– Light up when reflected light detected

2. Master Setting System

- Basic

When master material is unrolled below the Master loading unit (under green films), the Master loading unit is closed on it and the Master loading unit switch is thus pressed, 1 second later, the status of the Master positioning sensor is checked to see whether the sensor detects master material.

If no master material is detected, the master setting movement **(1)** described below starts.

If master material is detected, the master setting movement **(2)** described below starts.

- Master setting movement (1)

1 second after the Master loading unit switch is pressed, the Thermal pressure motor is activated to lower the Thermal print head until the actuator of the TPH pressure switch is pressed.

As the TPH pressure switch is pressed, the Write pulse motor and Loading pulse motor are activated to transfer master material towards the Master positioning sensor.

The Write pulse motor and Loading pulse motor stop to end the master feeding movement **22 pulses** after the Master positioning sensor detects the leading edge of the master.

At the same time the motors stop, the Thermal pressure motor is activated to raise the Thermal print head until the actuator of the TPH home position switch is pressed and the master setting movement (1) is completed.

- Master setting movement (2)

1 second after the Master loading unit switch is pressed, the Thermal pressure motor is activated to lower the Thermal print head until the actuator of the TPH pressure switch is pressed.

As the TPH pressure switch is pressed, the Write pulse motor and Loading pulse motor are activated to feed master material.

556 pulses later, the motors stop and the Cutter motor is activated, cutting the master material.

The machine panel indicates to remove a cut strip of master.

When the cut strip of master is removed as indicated on the panel and no master is thus detected by the Master positioning sensor, 1 second later, the Write pulse motor and Loading pulse motor restart to feed master material, towards the Master positioning sensor.

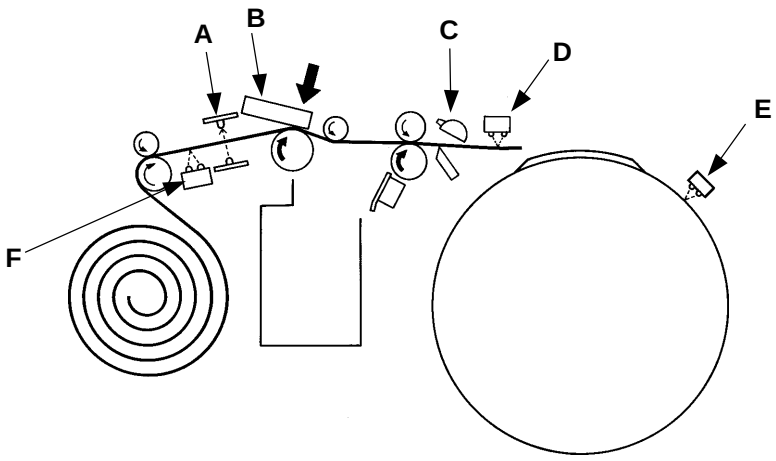
The Write pulse motor and Loading pulse motor stop to end the master feeding movement **22 pulses** after the Master positioning sensor detects the leading edge of the master.

At the same time the motors stop, the Thermal pressure motor is activated to raise the Thermal print head until the actuator of the TPH home position switch is pressed and the master setting movement (2) is completed.

- Status Check of Master Roll

The Master detection sensor checks whether or not master material is correctly set under the Master loading unit, and the Master end sensor detects the end of a roll of master, i.e. black tape.

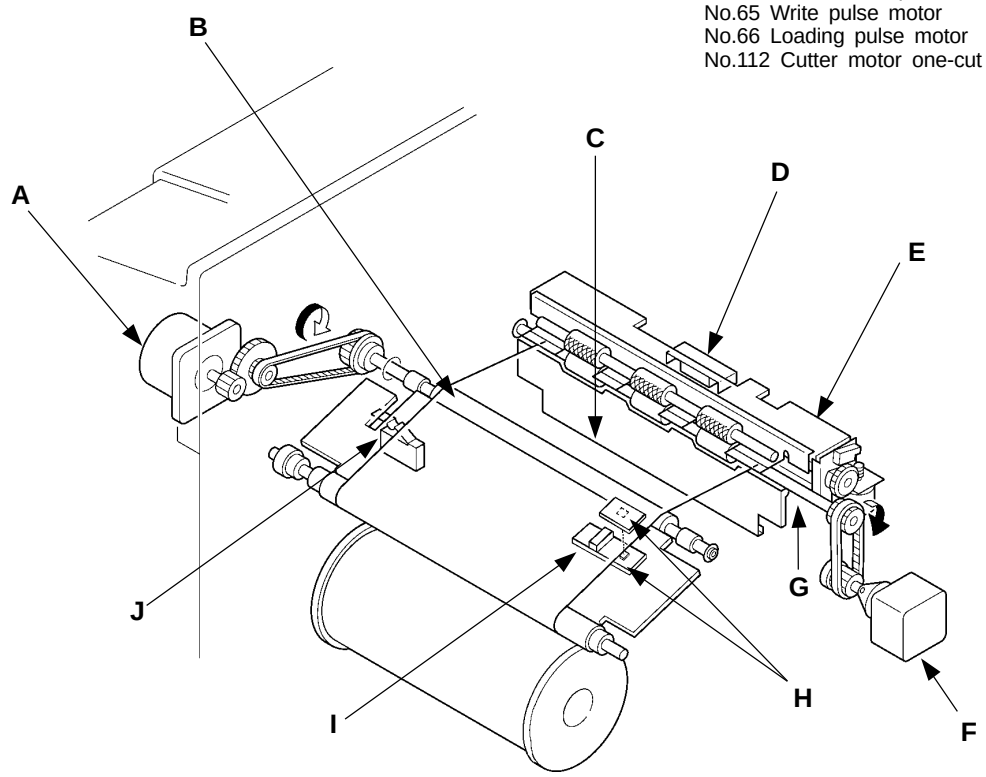
A: Master end sensor
B: Thermal print head
C: Cutter
D: Master positioning sensor
E: Master loading sensor
F: Master detection sensor



THEORY OF OPERATION

Test Mode No.15 Master positioning sensor
– Short interval beeps when reflected light detected
No.47 Master detection sensor
– Short interval beeps when reflected light detected
No.23 Master end sensor
– Short interval beeps when light path is blocked
No.29 Master loading unit switch
– Short interval beeps when pressed
No.65 Write pulse motor
No.66 Loading pulse motor
No.112 Cutter motor one-cut operation

B4 machine

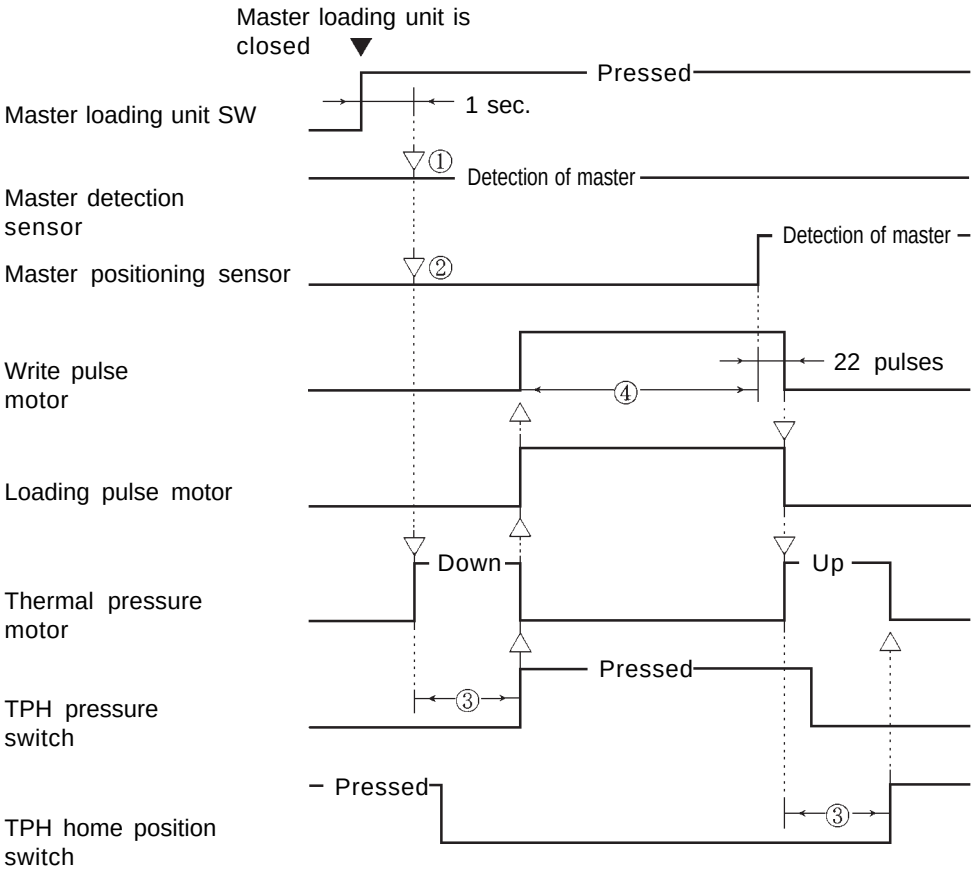


A: Write pulse motor
B: Write roller
C: Master guide plate
D: Master positioning sensor
E: Cutter unit
F: Loading pulse motor
G: Load roller (lower)
H: Master end sensor
I: Master detection sensor
J: Master loading unit switch

* When the Master detection sensor detects no master material (no reflected light), the machine assumes that a roll of master is not correctly set in the machine and displays the error message **"SET LEAD EDGE OF MASTER UNDER GREEN FILM"**.
* If the light path of the Master end sensor is blocked, i.e. the black tape is detected, the machine assumes a roll of master has been consumed and indicates the message "**REPLACE MASTER ROLL**" on the operation panel.
* If the Master loading unit switch is not pressed, the machine assumes the Master loading unit is not closed and indicates the error message **"CLOSE MASTER LOADING UNIT"**.

- Timing Chart -

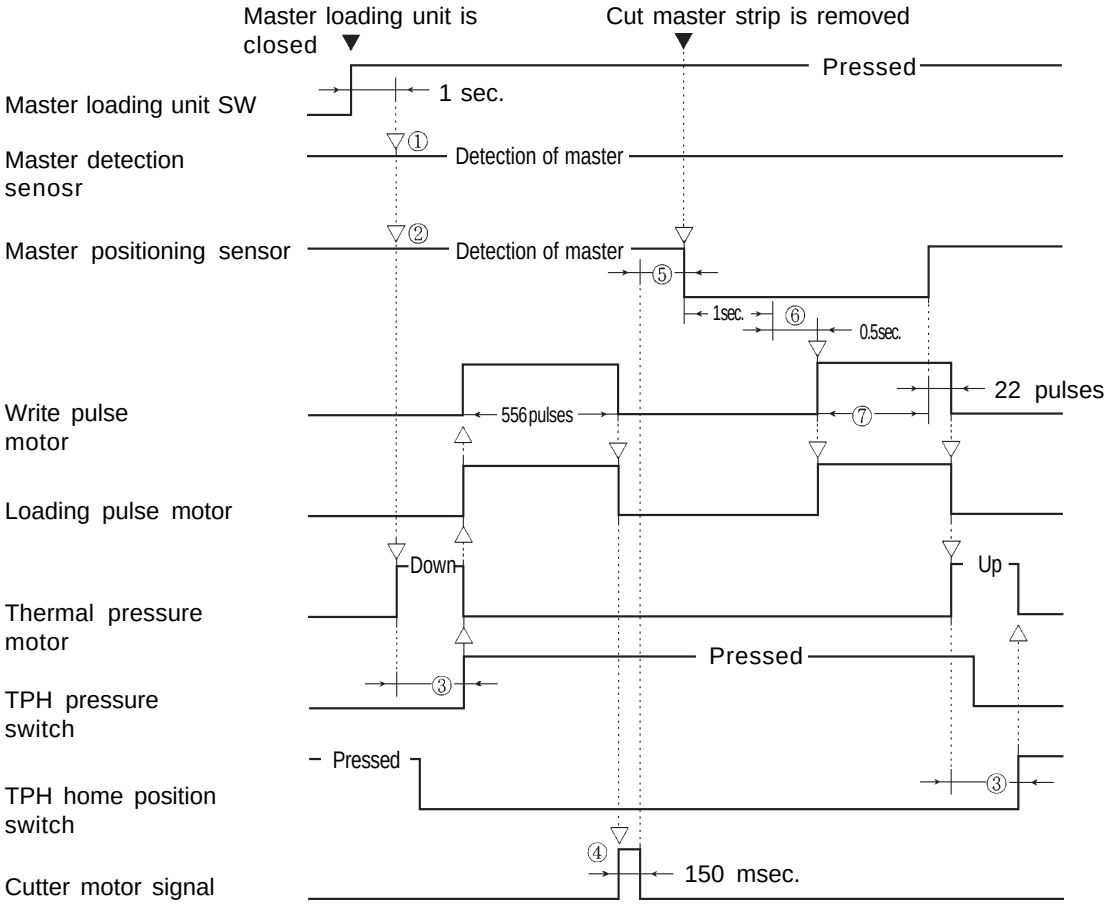
Master Setting Movement (1)



① The status of the Master detection sensor is checked to confirm the presence of master material.
② The status of the Master positioning sensor is checked to determine the next operation, i.e. Master setting movement (1) or (2), **1 second** after the Master loading unit is closed.
③ If the actuator of either the TPH pressure switch or TPH home position switch has not been pressed within **4 seconds** after the Thermal pressure motor is activated, the machine assumes that the Thermal pressure motor has locked and indicates the error code **[T 19]**.
④ If the Master positioning sensor has not detected master material **within 1260 pulses** after both the Write pulse motor and Loading pulse motor are activated, the machine assumes that master mis-feed has occurred and indicates the error message **"MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL"**.

- Timing Chart -

Master Setting Movement (2)



① The status of the Master detection sensor is checked to confirm the presence of master material.
② The status of the Master positioning sensor is checked to determine the next operation, i.e. the Master setting movement (2), **1 second** after the Master loading unit is closed.
③ If the actuator of either the TPH pressure switch or TPH home position switch has not been pressed **within 4 seconds** after the Thermal pressure motor is activated, the machine assumes that the Thermal pressure motor has locked and indicates the error code **[T 19]**.
④ The Cutter motor is deactivated after the Cutter motor signal is kept output for **150 msec**. and the actuator of the Cutter position switch is released OFF.
⑤ If the Master positioning sensor detects master material after the Cutter motor is activated, the machine assumes a cut strip of master remains inside the machine and indicates the message **"REMOVE CUT MASTER STRIP"**.
⑥ If the Master positioning sensor keeps unchanged in the status of "no detection of master" for **1 second**, the machine assumes that the cut master strip has been removed and, **0.5 second** later, the Write pulse motor and Loading pulse motor start to rotate.
⑦ If the Master positioning sensor has not detected master material **within 787 pulses** after both the Write pulse motor and Loading pulse motor are reactivated, the machine assumes that master mis-feed has occurred and indicates the error message **"MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL"**.

LED WAIT Master positioning sensor
– Light up when reflected light not detected

3. Master Free Feeding System

- Basic

The Master loading button starts the following operations whenever the machine is idle: master feeding, cutting and post-cutting feeding.

- Master Feeding

When the Master loading button is pressed, the Thermal pressure motor is activated to lower the Thermal print head until the actuator of the TPH pressure switch is pressed, and then the Write pulse motor and Loading pulse motor are activated to feed master material.

If the Master positioning sensor detects master when the Master loading button is pressed, as in normal cases, the Write pulse motor and Loading pulse motor stop **566 pulses** later.

If not, however, they stop 566 pulses after the Master positioning sensor detects master.

- Master Cutting

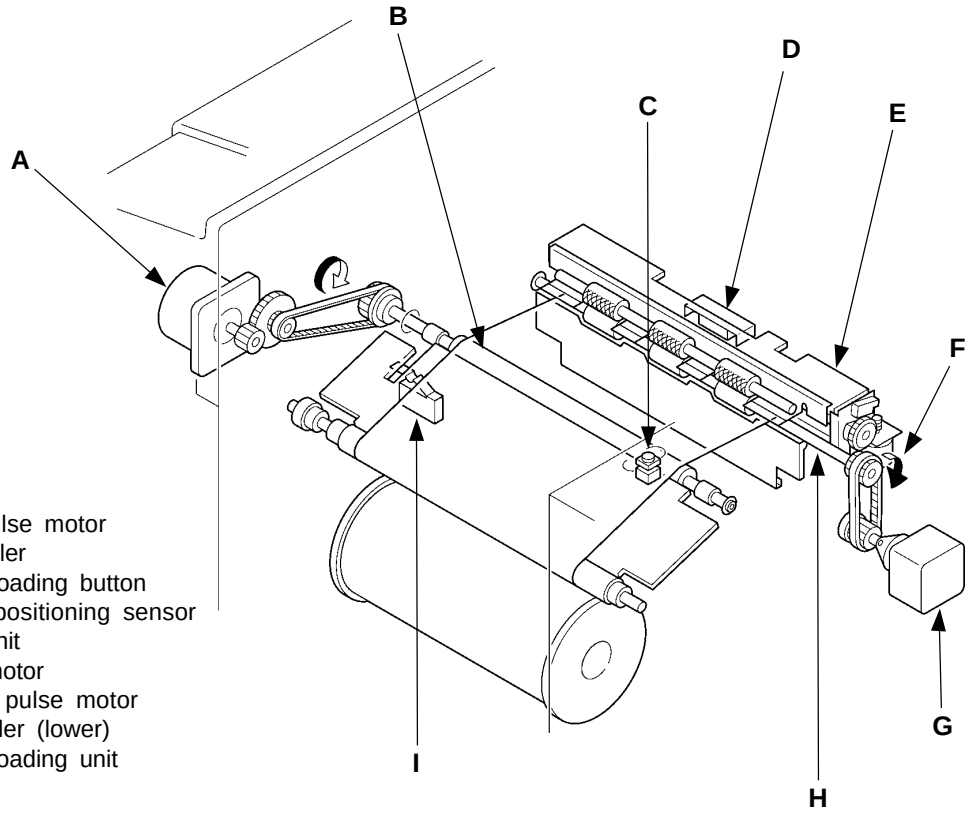
At the same time the motors stop, the Cutter motor is activated to cut the master material.

- Master Post-Cutting Feeding

When a cut strip of master is removed from the machine and the Master positioning sensor keeps unchanged in the status of "no detection of master" for 1 second, the machine assumes that the cut strip of master has been removed and, 0.5 second later, the Write pulse motor and Loading pulse motor is reactivated to feed the master material towards the Master positioning sensor.

As the Master positioning sensor detects the leading edge of the master material, the Write pulse motor counts **22 pulses** and then both the Write pulse motor and Loading pulse motor stop.

At the same time the motors stop, the Thermal pressure motor is activated to raise the Thermal print head unitl the TPH home position switch is pressed.



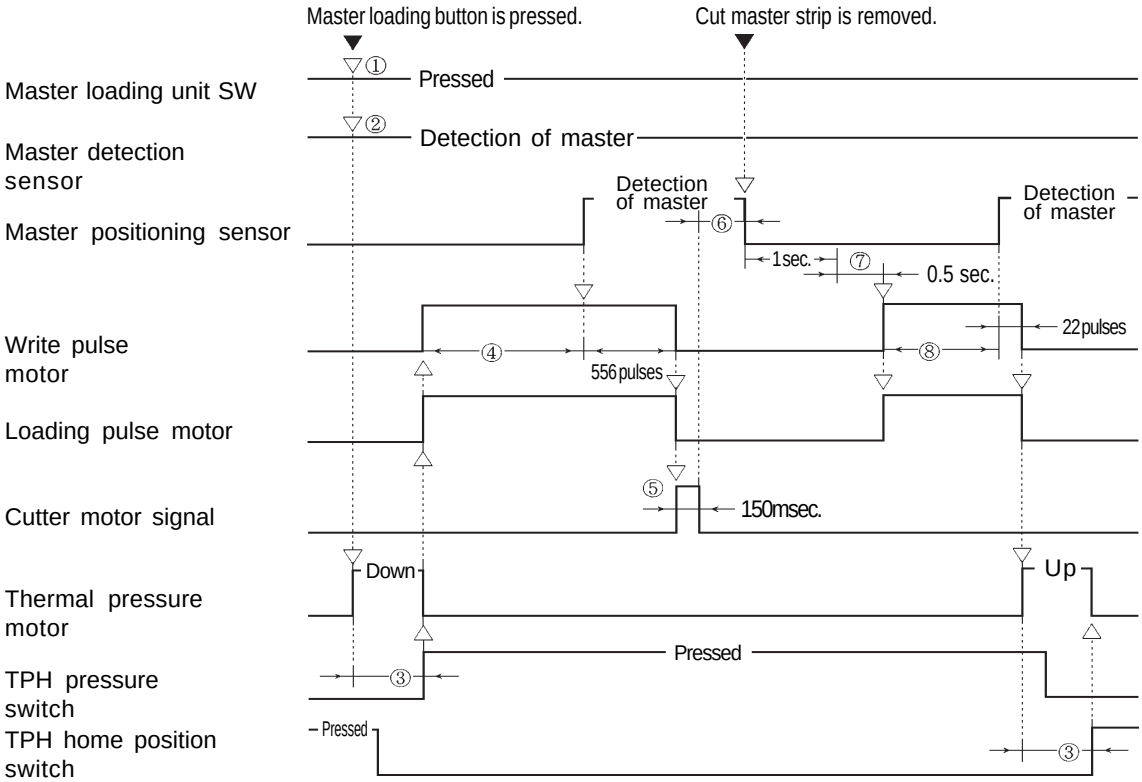
A: Write pulse motor
B: Write roller
C: Master loading button
D: Master positioning sensor
E: Cutter unit
F: Cutter motor
G: Loading pulse motor
H: Load roller (lower)
I: Master loading unit switch

THEORY OF OPERATION

Test Mode No.15 Master positioning sensor
– Short interval beeps when reflected light detected
No.05 Master loading button
– Short interval beeps when pressed
No.65 Write pulse motor
No.66 Loading pulse motor
No.112 Cutter motor one-cut operation

- Timing Chart -

Master Free Feeding System



① The status of the Master loading unit switch is checked to confirm that Master loading unit is closed.
② The status of the Master detection sensor is checked to confirm that it detects master material.
③ If the actuator of either the TPH pressure switch or TPH home position switch has not been pressed **within 4 seconds** after the Thermal pressure motor is activated, the machine assumes that the Thermal pressure motor has locked and indicates the error code **[T 19]**.
④ If the Master positioning sensor has not detected master material **within 1260 pulses** after both the Write pulse motor and Loading pulse motor are activated, the machine assumes that master mis-feed has occurred and indicates the error message **"MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL".**
⑤ The Cutter motor is deactivated after the Cutter motor signal is kept output for **150 msec**. and the actuator of the Cutter position switch is released OFF.
⑥ If the Master positioning sensor detects master material after the Cutter motor is activated, the machine assumes a cut strip of master remains inside the machine and indicates the error message **"REMOVE CUT MASTER STRIP"**.
⑦ If the Master positioning sensor keeps unchanged in the status of "no detection of master" for **1 second**, the machine assumes that the cut master strip has been removed and, **0.5 second** later, the Write pulse motor and Loading pulse motor start to rotate.
⑧ If the Master positioning sensor has not detected master material **within 787 pulses** after both the Write pulse motor and Loading pulse motor are reactivated, the machine assumes that master mis-feed has occurred and indicates the error message **"MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL"**.

LED MDTC Master detection sensor
– Light up when reflected light not detected
MEND Master end sensor
– Light up when reflected light detected
Test Mode No.47 Master detection sensor
– Short interval beeps when reflected light detected
No.23 Master end sensor
–Short interval beeps when light path is blocked

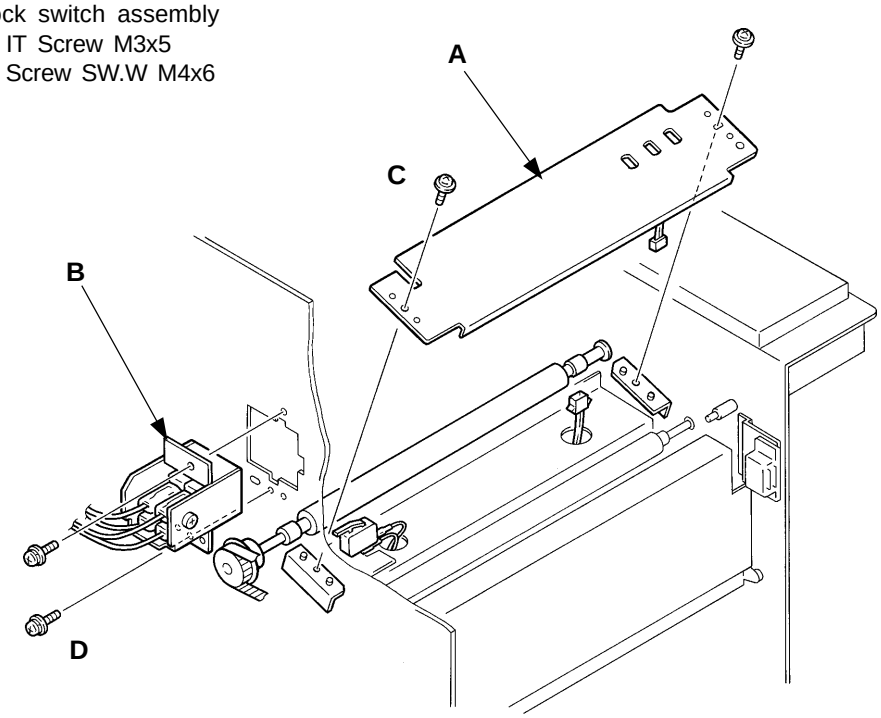
REMOVAL & ASSEMBLY

1. Set Guide Plate

Removal

1. Turn off the power and open the Scanner table and Master loading unit.
2. Remove the Front right cover.(A3 machine only)
3. Remove two mounting screws of the FB interlock switch assembly to make it loose.(A3 machine only)
4. Remove two mounting screws of the Set guide plate and disconnect the sensor's connector to remove the plate.

A: Set guide plate
B: FB interlock switch assembly
C: Pan-head IT Screw M3x5
D: Pan-head Screw SW.W M4x6

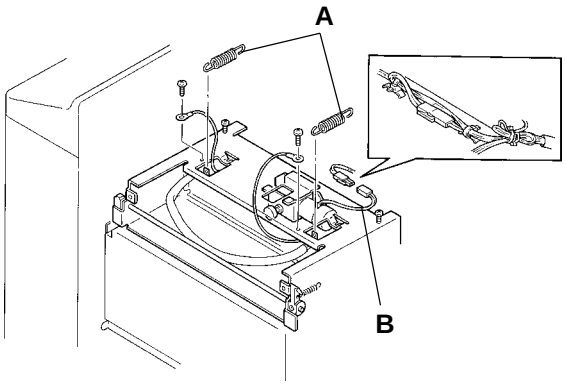


Test Mode No.31 TPH home position SW
– Short interval beeps when pressed
No.32 TPH pressure SW
– Short interval beeps when pressed
No.111 Thermal pressure motor operation

2. Thermal Pressure Motor Unit

Removal

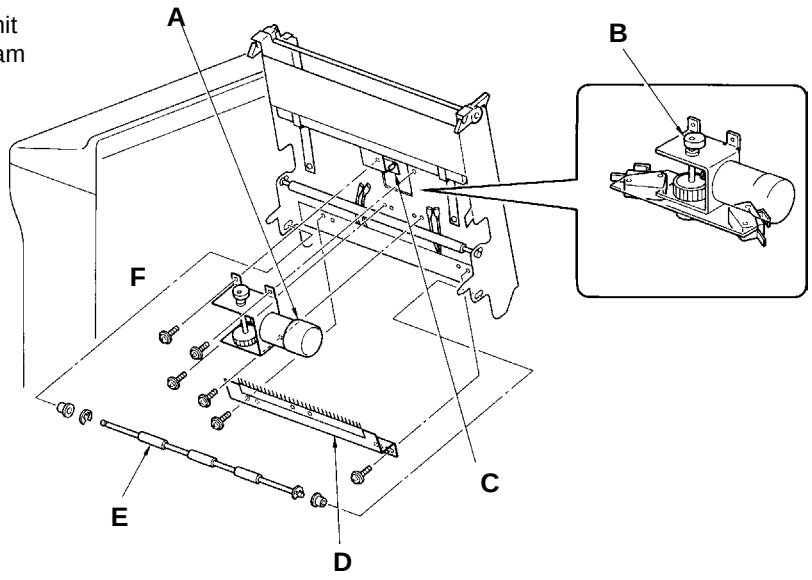
1. Turn off the power and remove the following parts.
   - Master loading unit cover (top), Copy guide plate (lower), Thermal print hesd (see Chapter16).
   - Set guide plate (see the previous page)
2. Remove two TPH pressure springs.
3. Disconnect the connector of the TPH pressure motor.



A: TPH pressure spring
B: Connector of Thermal pressure motor

4. Place a sheet of paper below the Master loading unit to prevent E rings and screws from dropping inside the machine when they are removed.
5. Remove an E ring securing a metal bearing at one end of the Load roller shaft and slide the metal bearing on the shaft off the Master loading unit frame.
   Remove the Load roller from the Master loading unit, shifting it sideways.
   [IMPORTANT]
   Don't drop the metal bearing at the other end of the Load roller shaft when removing the roller.
6. Remove two mounting screws on the De-electricity brush bracket, and remove the bracket.
7. Remove four mounting screws on the Thermal pressure motor unit, and remove the unit from the Master loading unit frame.
8. Holding the Thermal pressure motor unit, disconnect wires from the terminals of the TPH pressure SW and TPH home position SW.

A: Thermal pressure motor unit
B: Thermal pressure motor cam
C: TPH bracket
D: De-electricity brush bracket
E: Load roller
F: Pan-head IT Screw M3x5



Test Mode No.31 TPH home position SW
– Short interval beeps when pressed
No.32 TPH pressure SW
– Short interval beeps when pressed
No.111 Thermal pressure motor operation

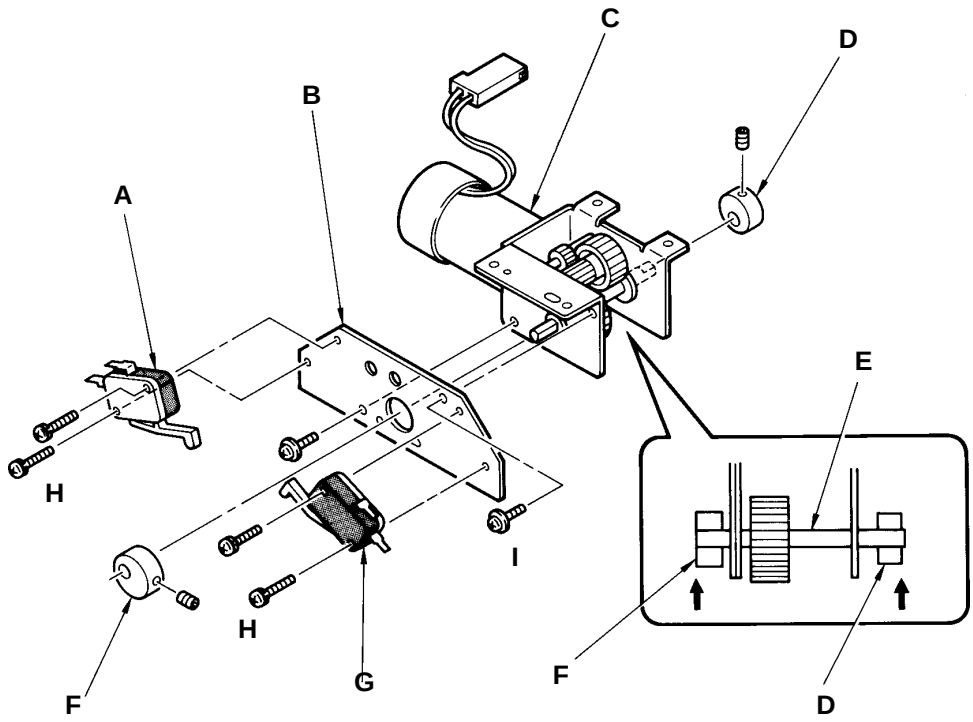
3. Thermal Pressure Motor

< Removal Procedure >

1. Remove the Thermal pressure motor unit.
2. Loosen the respective allen screws securing the Switch cam and Thermal pressure motor cam on the Thermal pressure motor shaft and remove these cams.
3. Remove two mounting screws on the Micro-sw bracket and separate the bracket from the Thermal pressure motor ass'y.

- Precautions in Assembly -

- Make sure to match the positioning holes of the Micro-sw bracket with the bosses on the Thermal pressure motor ass'y when attaching it.
- Remember that the Switch cam is larger than the Thermal pressure motor cam.
  Make sure to secure the Switch cam with its side face on a level with the end of the shaft, and the Thermal pressure motor cam with the end of the shaft protruding by 1mm from the cam's side face, as shown in the figure below.
- Make sure to tighten the allen screw on the flat cut face of the shaft when securing the cams.
- Make sure to put grease on the Thermal pressure motor cam.



A: TPH pressure SW
B: Micro-sw bracket
C: Thermal pressure motor
D: Thermal pressure motor cam
E: Thermal pressure motor shaft
F: Switch cam (large)
G: TPH home position SW
H: Pan-head Screw SW M3x14
I : Pan-head IT Screw M3x5

MEMO

CHAPTER 16: MASTER MAKING SECTION

Contents

THEORY OF OPERATION
1. Master Making System 16T-1

REMOVAL & ASSEMBLY
1. Write Roller 16R-1
2. Thermal Print Head 16R-3

ADJUSTMENT
1. Thermal Power of Thermal Print Head 16A-1
2. Image Elongation/Shrinkage Correction
   (Write Pulse Motor Speed Adjustment) 16A-3

THEORY OF OPERATION

1. Master Making System

- Start of Master Making

When the Start button is pressed with an original loaded, the TPH control signal is turned ON to supply heating power to the Thermal print head.

A certain period later, the Read and Write start signal is turned ON, which activates the Write pulse motor to rotate the Write roller and starts image data transmission from the Image processing PCB to the Thermal print head for image perforation on a master.

- Master Feeding

When the Write pulse motor starts rotating, master material is fed pulse by pulse by the Write roller, which is rotated via the <Write pulse motor pulley-belt-Pulley G> route.

At that time, the master is caught by the Torque limiter mounted Tension roller and Nip roller; it is prevented from image shrinkage by applying a constant back tension regardless of the diameter of the master roll.

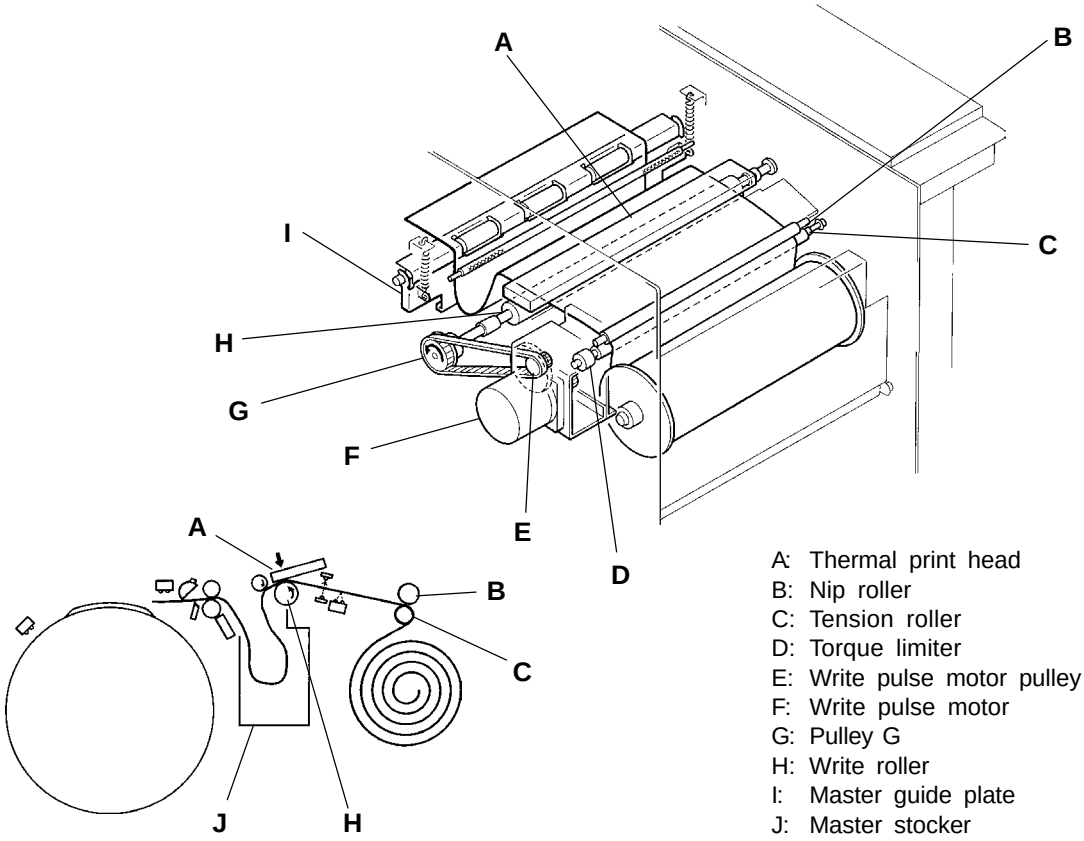
- Finish of Master Making

When a certain length of master has been made according to the size of an original or printing paper, the Read and Write start signal is turned OFF, which stops the rotation of the Write pulse motor and the image data transmission to finish image perforation on the master.

At the same time, the TPH control signal is turned OFF to terminate heating power supply to the Thermal print head, which is raised by the rotation of the Thermal pressure motor to release master material for master loading operation in the next step.

- Storage of a New-made Master

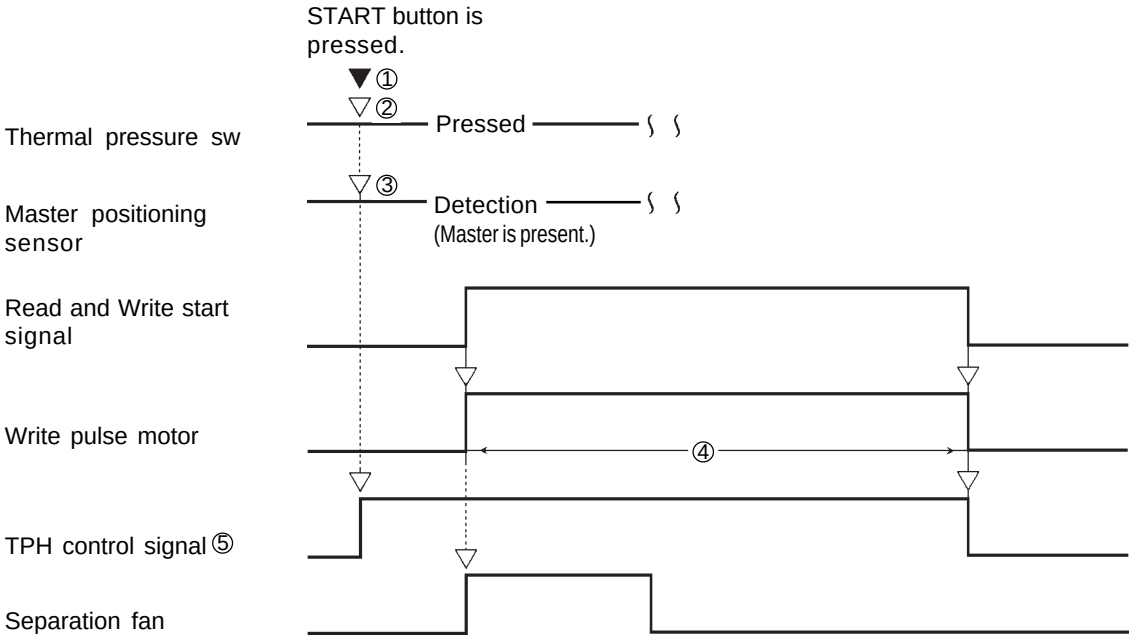
A new-made master is pulled into the Master stocker by air suction originating from the Separation fan operating at the beginning of master making (master removal) operation, and stored there to await loading on the Drum while an old master is removed from it.



A: Thermal print head
B: Nip roller
C: Tension roller
D: Torque limiter
E: Write pulse motor pulley
F: Write pulse motor
G: Pulley G
H: Write roller
I: Master guide plate
J: Master stocker

- Timing Chart -

Master Making System



① The START button input is not accepted while an original is being loaded into the ADF unit.
② If the TPH pressure switch is not pressed ON, the master making operation starts after the Thermal pressure motor is rotated until the TPH pressure switch has been pressed ON.
③ If the Master positioning sensor detects no master (reflected light), the master making operation starts after a master is fed to the Master positioning sensor.
④ The Write pulse motor is deactivated at the same time the Read and Write start signal is turned OFF.
If the Write pulse motor has not been rotated by **4566 pulses** at this point yet, however, it is deactivated only after it has been rotated by **4566 pulses** because a new-made master can't be fed to the Drum without some master stored into the Master stocker.
⑤ When the TPH control signal is turned ON, power (voltage) is applied to the Thermal print head.

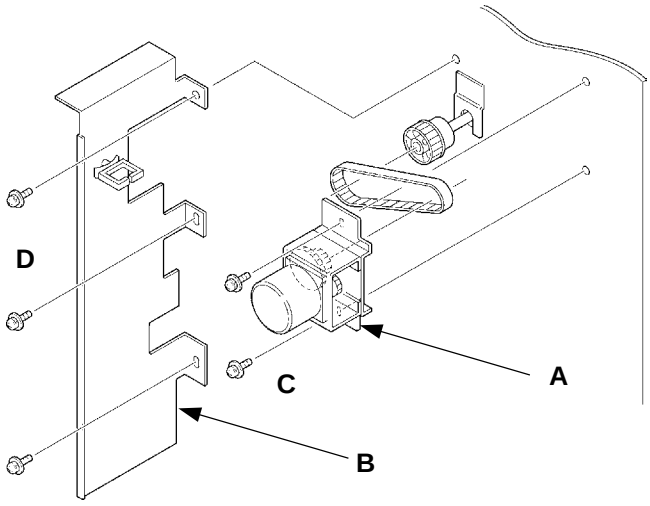
REMOVAL & ASSEMBLY

1. Write Roller

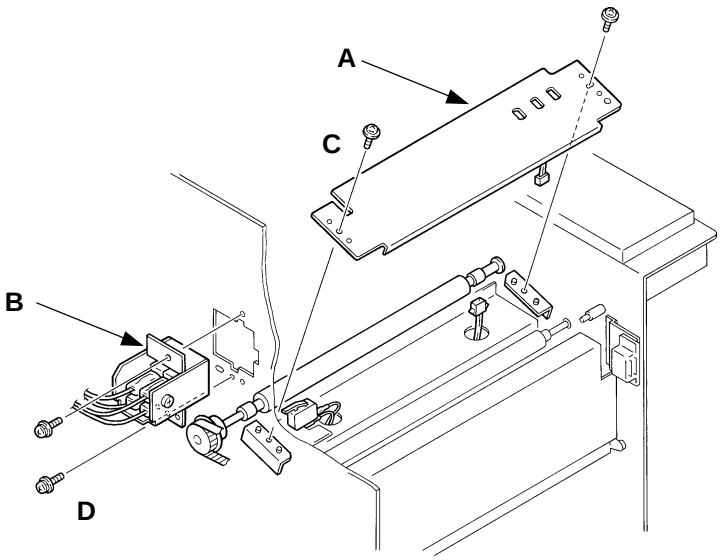
Removal

1. Disconnect the Power cord and remove the Front right cover.
2. Remove three mounting screws on the Power supply cover plate located on the left of the Power supply unit, and let the plate hang free.
3. Remove two mounting screws on the Write pulse motor, and remove the belt on the Pulley G.
4. Remove two mounting screws of the FB interlock switch assembly to make it loose.(A3 machine only)
5. Remove two mounting screws of the Set guide plate and disconnect the sensor's connector to remove the plate. (A3 machine only)

A: Write pulse motor
B: Power supply cover plate
C: Pan-head Screw SW.W M4x8
D: Pan-head Screw SW.W M4x6



A: Set guide plate
B: FB interlock switch assembly
C: Pan-head IT Screw M3x5
D: Pan-head Screw SW.W M4x6



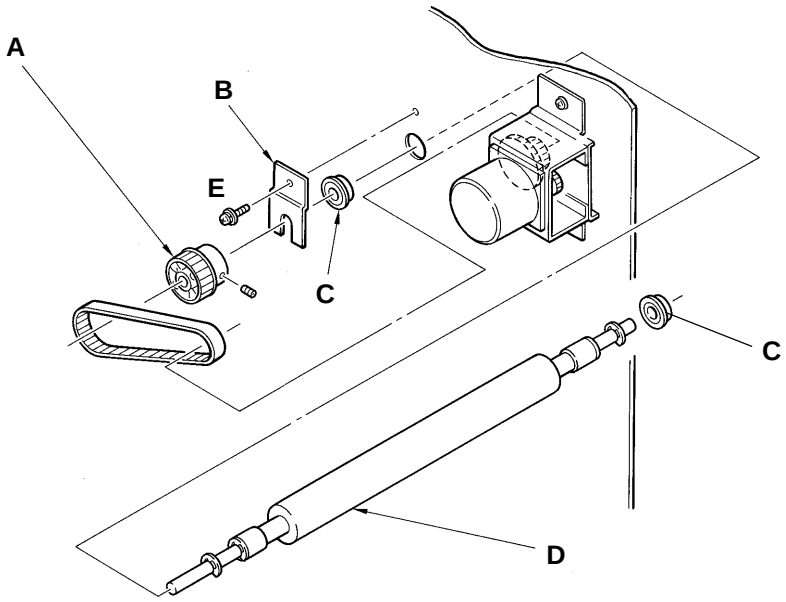
6. Loosen the allen screw securing the Pulley G on the shaft and slide the pulley off the shaft.
7. Remove the securing screw on the Bearing fixing plate and remove the plate and bearing.
8. Pull the Write roller toward the operation panel side to slide out the other end from the rear side machine frame and take it out from below the Master loading unit.
   [IMPORTANT]
   There is a bearing put on the other end of the Write roller. Do not drop it into the machine.

- Precautions in Assembly -

- Do not mount the Bearing fixing plate in reverse. The face with the part number imprinted should face you. Besides, make sure to match a small boss on the plate into a hole on the machine frame when securing it.
- Mount the Pulley G so that its outer face can be level with the end of the Write roller shaft. The allen screws should be tightened on the flat-cut face of the Write roller shaft.
- Confirm that the tension of the belt on the Write pulse motor is not too loose nor too tight after assembly.

- Phenomenon with a worn Write roller -

- If the Write roller is worn;
  images on prints may appear blurred on the edges, or wrinkles will be made during master making.



A: Pulley G
B: Bearing fixing plate
C: Bearing
D: Write roller
E: Pan-head Screw SW.W M4x6

2. Thermal Print Head

< Removal Procedure >

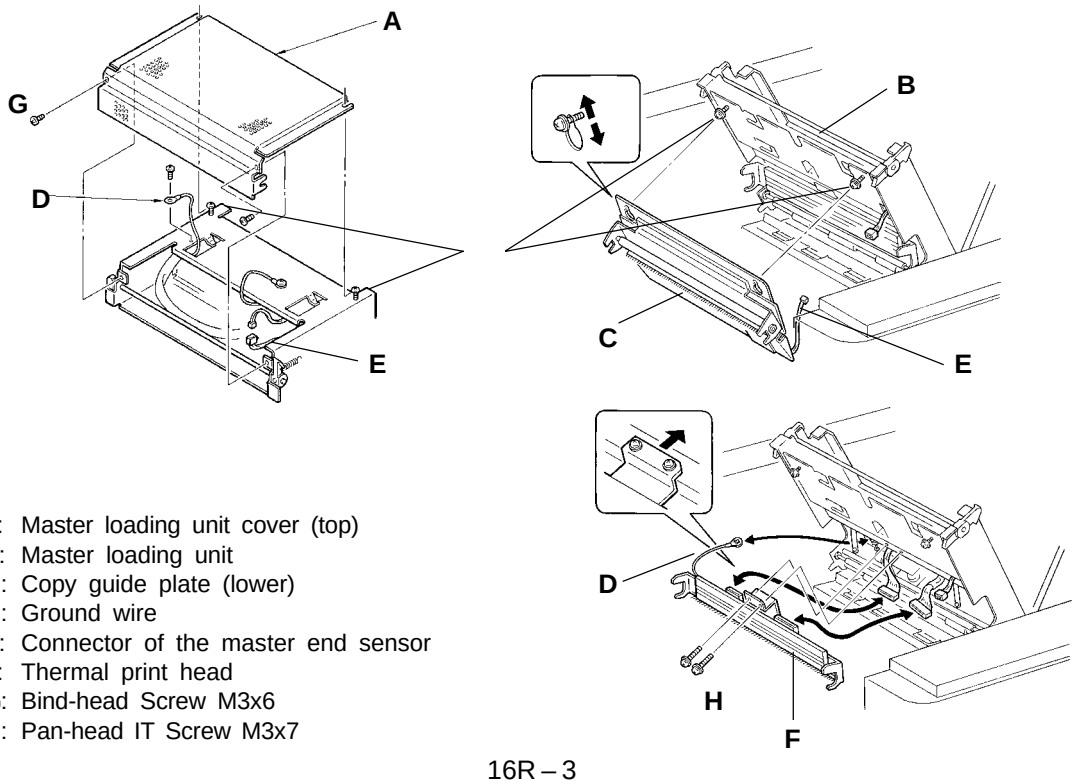
1. Turn ON the power and open the Scanner table.
   Then turn OFF the power.
   [Note]
   The above procedure is to raise the Thermal print head.
2. Loosen two mounting screws on the top of the Master loading unit cover (top) and remove other two mounting screws on the front of the cover. Then remove the cover.
3. Remove the ground wire by loosening the securing screw.
4. Disconnect the connector of the Master end sensor (receive).
5. Open the Master loading unit, and place a sheet of paper under the Thermal print head.
   [Note]
   This is to prevent screws from falling inside the machine when they are removed.
6. Loosen two mounting screws on the Copy guide plate (lower), and remove the plate.
   [IMPORTANT]
   Be careful not to damage the heating elements of the Thermal print head when removing the cover.
7. Remove two mounting screws on the bracket of the Thermal print head, disconnect two connectors from the Thermal print head and remove it from the Master loading unit.

- Precautions in Removal -

- Be careful not to damage the heating elements of the Thermal print head.
- Be careful not to touch the metal pins of the connectors.
  Static electricity from your body (finger) may damage the Thermal print head.

- Precautions in Assembly -

- Be sure to adjust the thermal power each time the Thermal print head is replaced.



A: Master loading unit cover (top)
B: Master loading unit
C: Copy guide plate (lower)
D: Ground wire
E: Connector of the master end sensor
F: Thermal print head
G: Bind-head Screw M3x6
H: Pan-head IT Screw M3x7

MEMO

ADJUSTMENT

1. Thermal Power of Thermal Print Head

PROCEDURE

1) Turn off the power, and remove the Front right cover.
2) Connect a voltmeter between pins TP1(+) and TP2(GND) on the power supply PCB.
3) Turning ON Test Mode No.77 (TPH/CTL signal), confirm that the voltage displayed on the voltmeter conforms to the setting table according to the thermal print head resistance value.
5) If not, adjust VR100/VR101 for Power Supply PCBH and VR401/VR402 for Power Supply PCBH (VR101/402: Fine adjustment, VR100/401: Rough adjustment).
6) On completion of adjustment, turn off the power and detach the voltmeter.
7) Carry out master-making and confirm results.

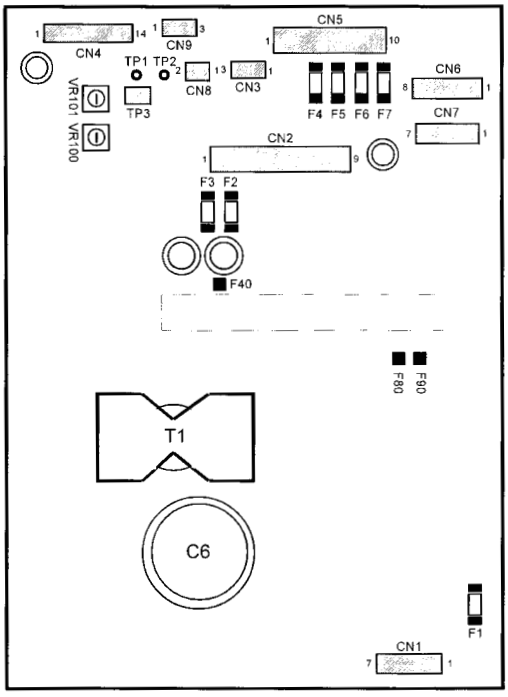
- Precautions in Adjustment -

- This adjustment has to be made every time the thermal print head is replaced.
- The Scanner table should be closed to apply power to the thermal print head. Othewise, the interlock SW will interrupt the power.

- Results of misadjustment -

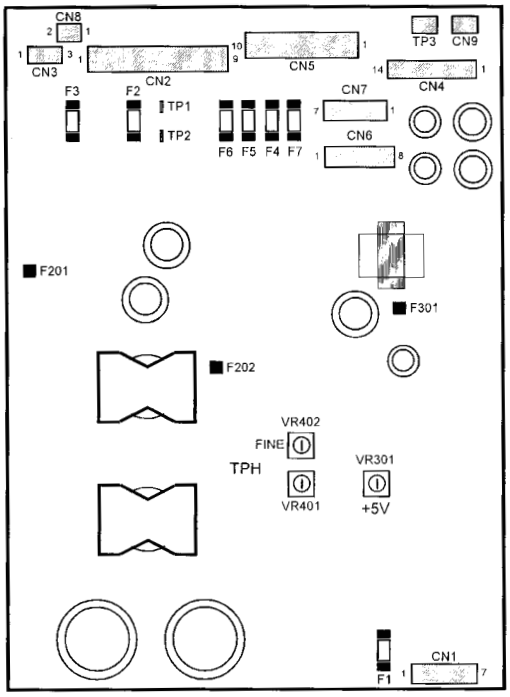
- If the voltage is too high ; solid print image will be deformed and the heating elements of the thermal print head will be liable to damages due to over heat.
- If the voltage is too low ; thin horizontal lines cannot to reproduced clearly.

Power Supply PCB H



019-5138-H (100V)

Power Supply PCB N



019-51038-N (100V)
019-51023-N (200V)

TPH Voltage Setting Table < 400 dpi models >

T-TPH

Resistance (ý)	Voltage (V)
1623~1645	14.0
1646~1669	14.1
1670~1692	14.2
1693~1716	14.3
1717~1740	14.4
1741~1764	14.5
1765~1789	14.6
1790~1813	14.7
1814~1838	14.8
1839~1863	14.9
1864~1888	15.0
1889~1913	15.1
1914~1938	15.2
1939~1964	15.3
1965~1989	15.4
1990~2015	15.5
2016~2041	15.6
2042~2067	15.7
2068~2094	15.8
2095~2120	15.9
2121~2147	16.0
2148~2174	16.1
2175~2201	16.2
2202~2228	16.3
2229~2255	16.4
2256~2283	16.5
2284~2310	16.6
2311~2350	16.7

K-TPH

Resistance (ý)	Voltage (V)
1989~2000	16.2
2001~2025	16.3
2026~2050	16.4
2051~2075	16.5
2076~2100	16.6
2101~2125	16.7
2126~2151	16.8
2152~2177	16.9
2178~2202	17.0
2203~2228	17.1
2229~2254	17.2
2255~2280	17.3
2281~2307	17.4
2308~2333	17.5
2334~2360	17.6
2361~2387	17.7
2388~2414	17.8
2415~2441	17.9
2442~2468	18.0
2469~2496	18.1
2497~2523	18.2
2524~2551	18.3
2552~2579	18.4
2580~2607	18.5
2608~2635	18.6
2636~2663	18.7
2664~2692	18.8

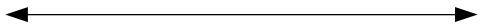
2. Image Elongation/Shrinkage Correction (Write Pulse Motor Speed Adjustment)

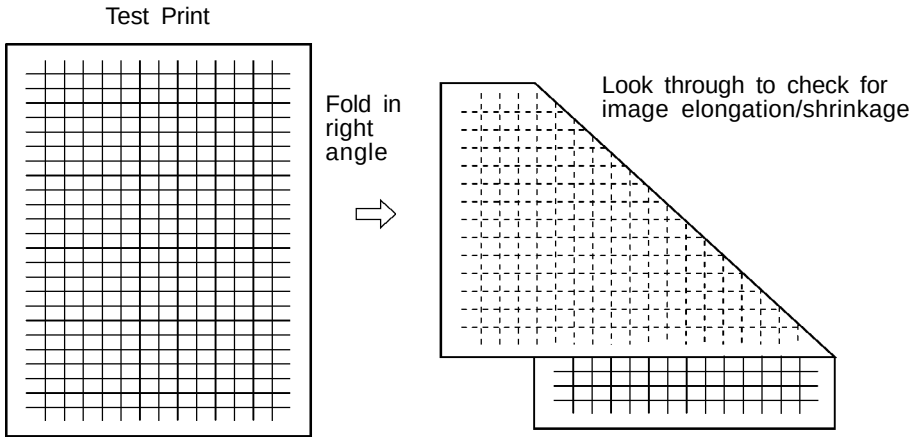
- Checking and Method

1. Put the same size of the paper as the effective printing area on the Paper feed tray and run test print(Test Mode No. 119).
2. Fold the output test print slantly at a right angle as shown below, and make sure that the main scan block and sub-scan block overlap properly.
3. If not overlapping, adjust a write pulse motor speed in Test Mode(Memory Switch) No. 221. Press the PRINT POSITION button to select a Memory switch setting referring to the chart below.
4. Adjust image elongation/shrinkage so that it will be finally within ±1.4 %.
   (25 cm x 1.4 % = 3.5 mm, 30 cm x 1.4 % = 4.2 mm)

No. 221 Write Pulse Motor Speed Control

SW setting	9	A	B	C	D	E	F	O
Amount (mm)	-7	-6	-5	-4	-3	-2	-1	0
SW setting	1	2	3	4	5	6	7	8
Amount (mm)	+1	+2	+3	+4	+5	+6	+7	+8





MEMO

CHAPTER 17: MASTER CLAMP & LOADING SECTION

Contents

THEORY OF OPERATION
1. Master Clamping System 17T-1
2. Master On-Drum Loading System 17T-3
3. Master Post-Cutting Feeding System 17T-6
4. Post-Master-Miscut Operation 17T-8

REMOVAL & ASSEMBLY
1. Loading Fan <B4/A4/Legal> 17R-1

LED DRM0 0° Angular sensor
– Light up when magnetism is detected

THEORY OF OPERATION

1. Master Clamping System

- Basic

When a used master is removed from the drum, a new-made master proceeds to the drum and its top part is caught by the Clamp plate.

- Preoperations for Master Clamping

The following steps are already completed before closing the Clamp plate.

1. The Main motor stops and the Drum is at the home position.
2. It is confirmed that the light path of the Master removal sensor is open (a removed master has entered the Master disposal box). **100 msec later**, the Clamp solenoid is activated, lowering the Clamp unit to the Drum, by which the gear on the Clamp motor is engaged with that of the Clamp plate.
3. The Clamp safety switch is released at the same time, causing the Loading pulse motor to start rotating, by which the Load rollers are rotated to feed a new-made master to the Drum.
4. **317 pulses later**, the Loading pulse motor stops to finish master feeding to the Drum.

- Closing of Clamp Plate

When the Loading pulse motor stops, the Clamp motor starts to rotate the Clamp motor gear, causing the Clamp plate to close on the top part of the fed master.

- Return of Clamp Unit

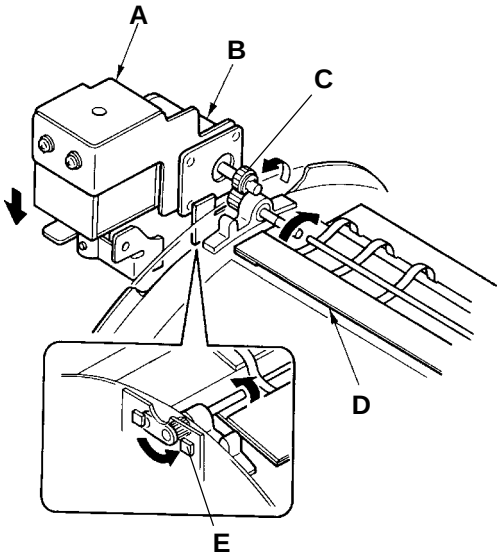
When the 0° Angular sensor detects magnetism of the Angular magnet on the Angular magnet plate attached to the end of the Clamp plate shaft, it is assumed that the Clamp plate has been closed and the Clamp motor and Clamp solenoid are simultaneously deactivated.

- Finish of Master Clamping

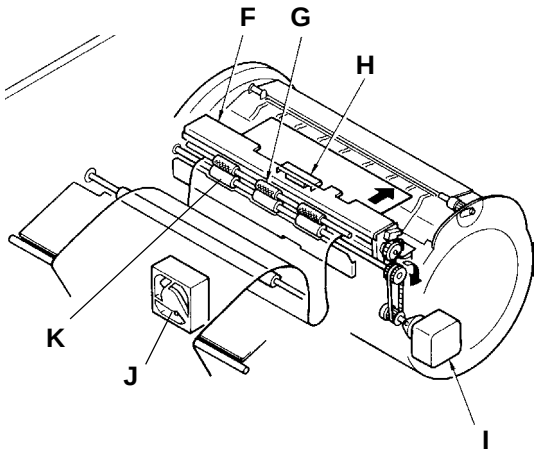
When the Clamp solenoid is deactivated, the Clamp unit is returned to the initial (retreat) position and presses the actuator of the Clamp safety switch, by which it is confirmed that the new-made master is now ready to be loaded on the Drum with its top part secured by the Clamp plate.

- Protection of Clamp Solenoid

When the Clamp solenoid is energized, the Range setting switch is actuated ON to reduce the current flowing through the solenoid for protecting it against overheat.



A: Clamp solenoid
B: Clamp motor
C: Clamp motor gear
D: Clamp plate
E: 0° Angular sensor
F: Cutter unit
G: Load roller (upper)
H: Master positioning sensor
I: Loading pulse motor
J: Loading fan
K: Load roller (lower)

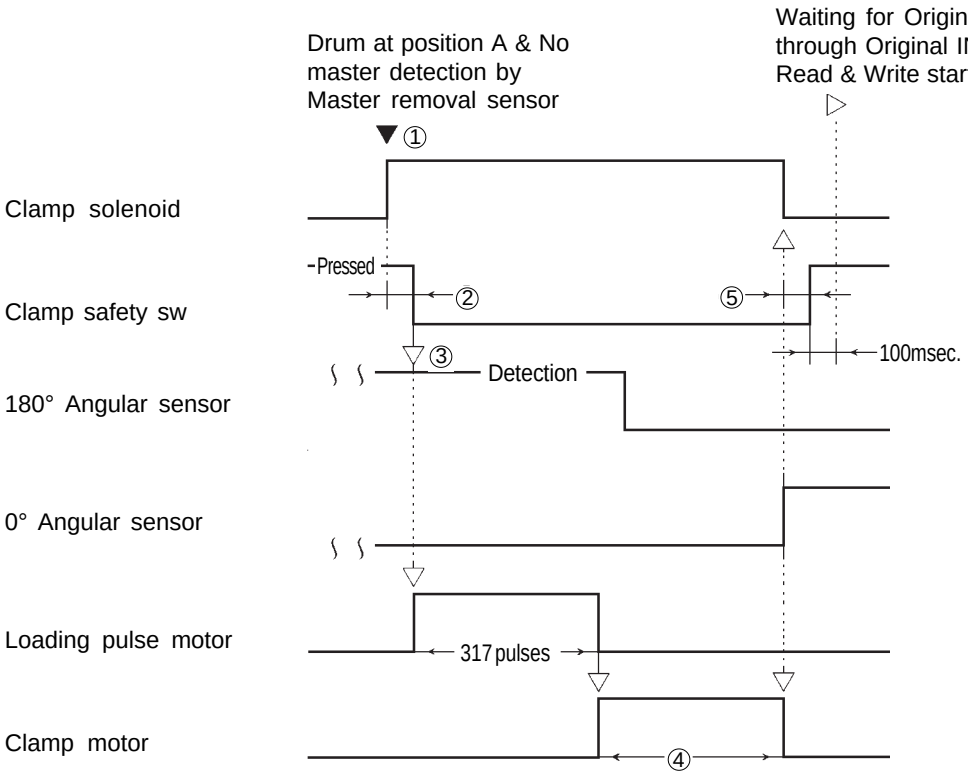


THEORY OF OPERATION

Test Mode No.09 0° Angular sensor
– Short interval beeps when magnetism is detected
No.13 Clamp safety SW
– Short interval beeps when pressed
No.73 Clamp solenoid
No.66 Loading pulse motor

- Timing Chart -

Master Clamping System



① During Master removal operation, if a removed Master is still detected by the Master removal sensor when the Drum returns to Position A, the Clamp solenoid is not activated until the removed Master clears through the sensor completely.

② If the Clamp safety switch has not been released **within 4 seconds** after the Clamp solenoid is activated, the solenoid is deactivated and the Drum is rotated again and stops at Position A. The solenoid is reactivated after the Drum stops at Position A, and if the Clamp safety sw remains actuated **for 4 seconds**, the machine assumes a **Clamp error-1** has occurred and displays the error code **[T 3]**.

③ If the 180° Angular sensor does not detect a magnet, the Clamp motor operates until the magnet is detected, after which the Loading pulse motor is activated.

④ If the 0° Angular sensor has not detected a magnet **within 8 seconds** after the Clamp motor is activated, the machine assumes a **Clamp error-1** has occurred and displays the error code **[T 3].**

⑤ If the Clamp safety switch has not been pressed **within 4 seconds** after the Clamp solenoid is deactivated, the machine assumes a **Clamp error-1** has occurred and displays the error code **[T 3].**

T3 (Clamp Error (1))
• Clamp safety switch not turned ON/OFF • 0°Angle sensor not turned ON

LED CSEN Master loading sensor
– Light up when reflected light detected
WAIT Master positioning sensor
– Light up when reflected light not detected
DRMC Position C sensor
– Light up when light path is blocked

2. Master On-Drum Loading System

- Basic

When the top part of a new-made master has been caught by the Clamp plate, the Drum starts rotating to load the master on the Drum.

- Start of Master On-Drum Loading

After the Clamp plate operation is completed, the Original IN sensor status is checked to ensure that the scanning of an original is close to the end.

When it is confirmed that the trail edge of an original has passed through the Original IN sensor (that the light path of the Original IN sensor is opened), or the Read and Write start signal is turned off (in case the Write pulse motor has been rotated for the preset pulses before an original passes through the Original IN sensor), the Main motor and Print signal are turned on, causing the Drum to rotate and paper to start feeding.

- Function of Loading Fan

At the same time the Main motor is turned on, the Loading fan starts to suck air and attracts the master waiting in the Master stocker to secure correct master loading on the Drum.

- Check of Master On-Drum Loading Error [Position C-1]

As the Drum rotates and the Plate C-1 is detected by the Position C sensor, the Master loading sensor is activated to check the master status on the Drum to determine if a master (on-drum) loading error has occurred.

- Master Cutting & Lowering of Thermal Print Head [Position C-2]

As the Drum rotates further and the Plate C-2 is detected by the Position C sensor, the Cutter motor is activated to cut the master with the Rotary cutter and simultaneously the Thermal pressure motor rotates until the TPH pressure switch is depressed to apply pressure on master material.

- Check of Master Cutting Error [Home Position A]

As the Drum rotates further and the Plate A is detected by the Position A sensor, the Master positioning sensor is activated to determine if a master cutting error has occurred.

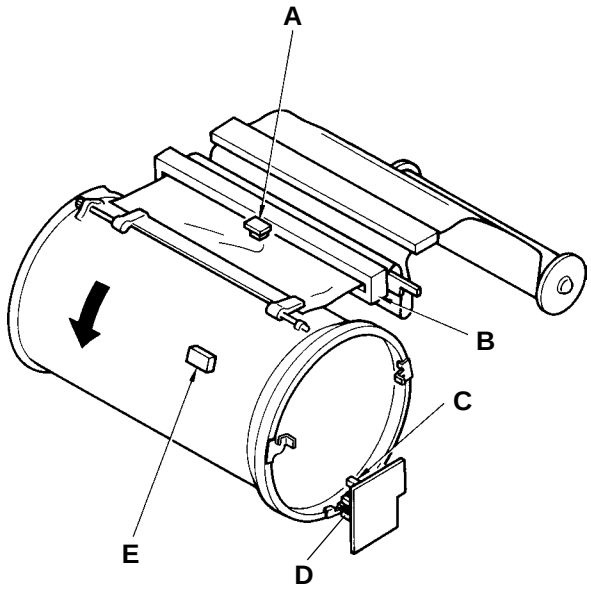
If master material is detected by the Master positioning sensor at this position, it is assumed that a master cutting error has occurred.

- Advance of Master for Next Master-Making

If it is determined that no master cutting error has occurred, the Write and Loading pulse motors rotate to advance master material into position for the next master-making operation.

The new-made master is closely loaded on the Drum, feeding a sheet of paper.
(No paper feeds in the confidential operation.)

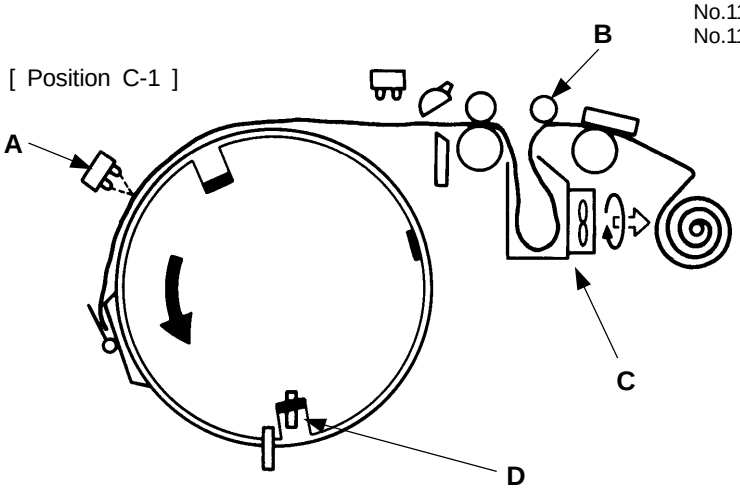
A: Master positioning sensor
B: Cutter unit
C: Position C sensor
D: Position A sensor
E: Master loading sensor



THEORY OF OPERATION

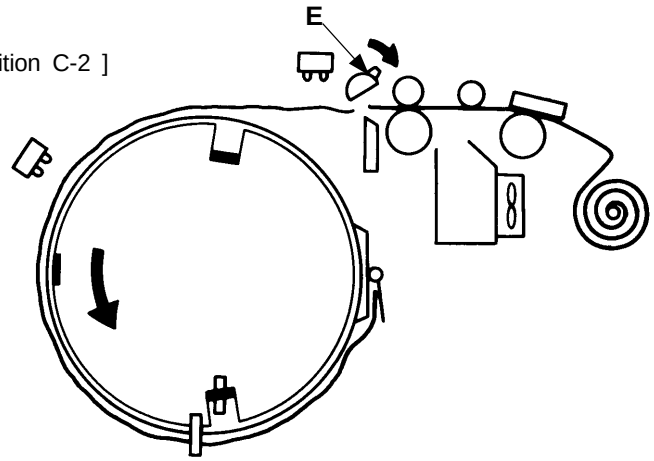
Test Mode No.11 Position C sensor
– Short interval beeps when light path is blocked
No.15 Master positioning sensor
– Short interval beeps when reflected light detected
No.48 Master loading sensor
– Short interval beeps when reflected light detected
No.72 Loading fan
No.112 Cutter motor one-cut operation
No.111 Thermal pressure motor operation

[Position C-1]



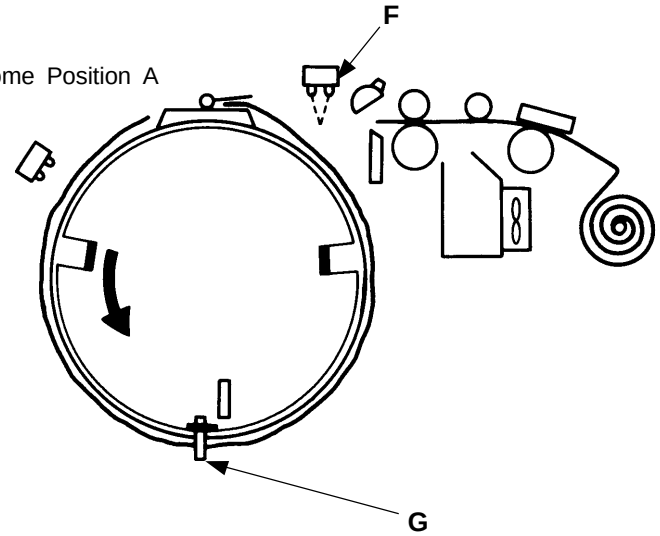
Check of Master On-Drum Loading Error

[Position C-2]



Master Cutting

[Home Position A]

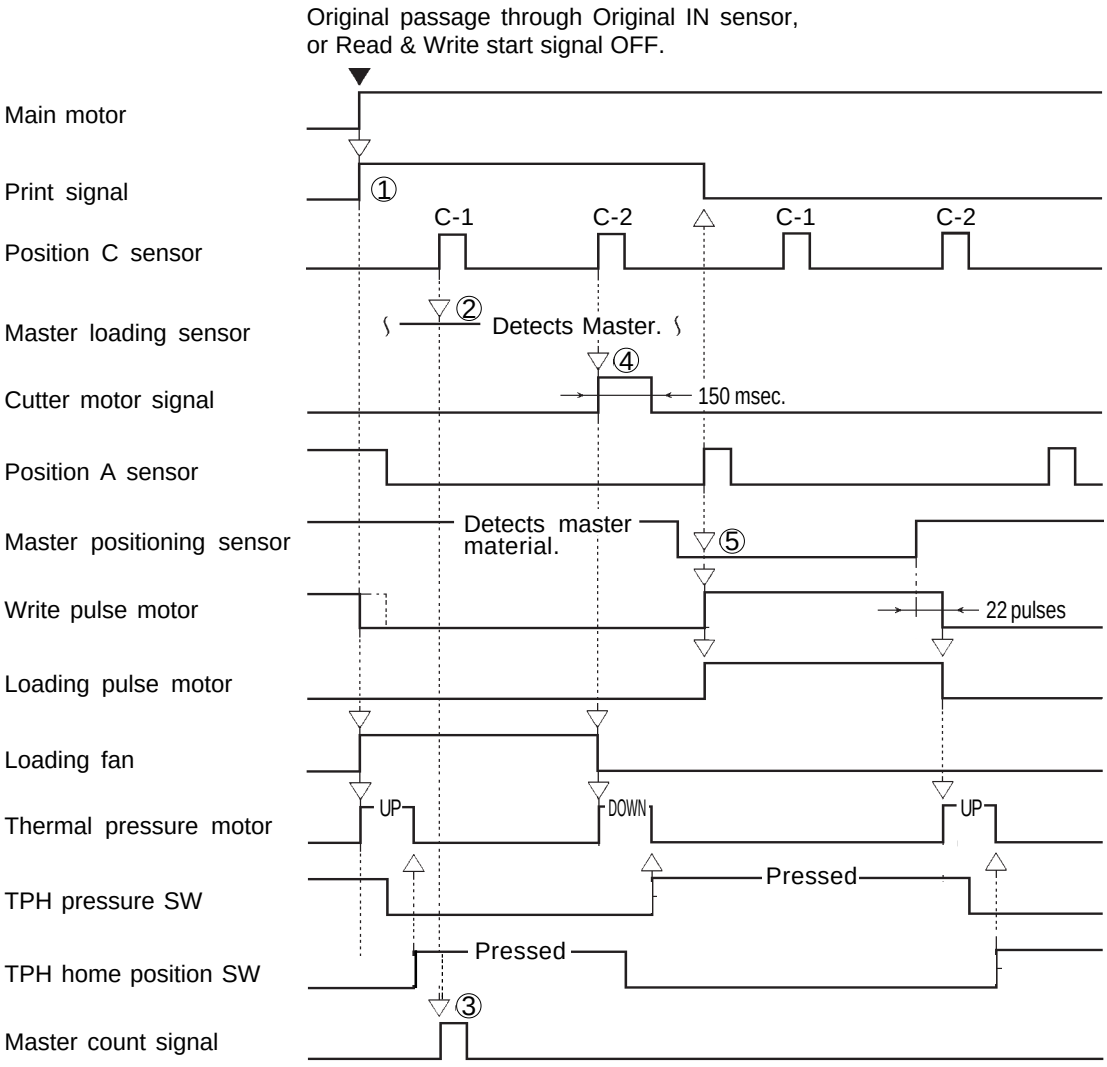


Check of Master Cutting Error

A: Master loading sensor
B: Catch roller
C: Loading fan
D: Position C sensor
E: Cutter unit
F: Master positioning sensor
G: Position A sensor

-Timing Chart -

Master On-Drum Loading System



① The Print signal starts the paper feed operation.
② If the Master loading sensor does not detect master on the Drum, the machine assumes a **Master loading error** has occurred and displays the error message **"CLAMP ERROR REMOVE MASTER ROLL THEN RE-INSTALL"**.
③ If the Master loading sensor detects master on the Drum, the Master count signal is output to increase the Total master counter by 1.
④ When the Cutter motor signal is output, the Cutter motor is activated.
The motor stops when the Cutter position switch is released.
⑤ If the Master positioning sensor detects master material, the machine assumes a **Master cutting error** has occurred and proceeds to a recovering action.

LED WAIT Master positioning sensor
– Light up when reflected light not detected

3. Master Post-Cutting Feeding System

- Basic

When the Drum rotates to the Home position A after master cutting in master loading operation and it is confirmed that the Master positioning sensor detects no master (no reflected light), that is, no master cut error has occurred, the Write pulse motor and Loading pulse motor are activated to feed master material until the Master positioning sensor detects the master material.

- Function of Write Pulse Motor

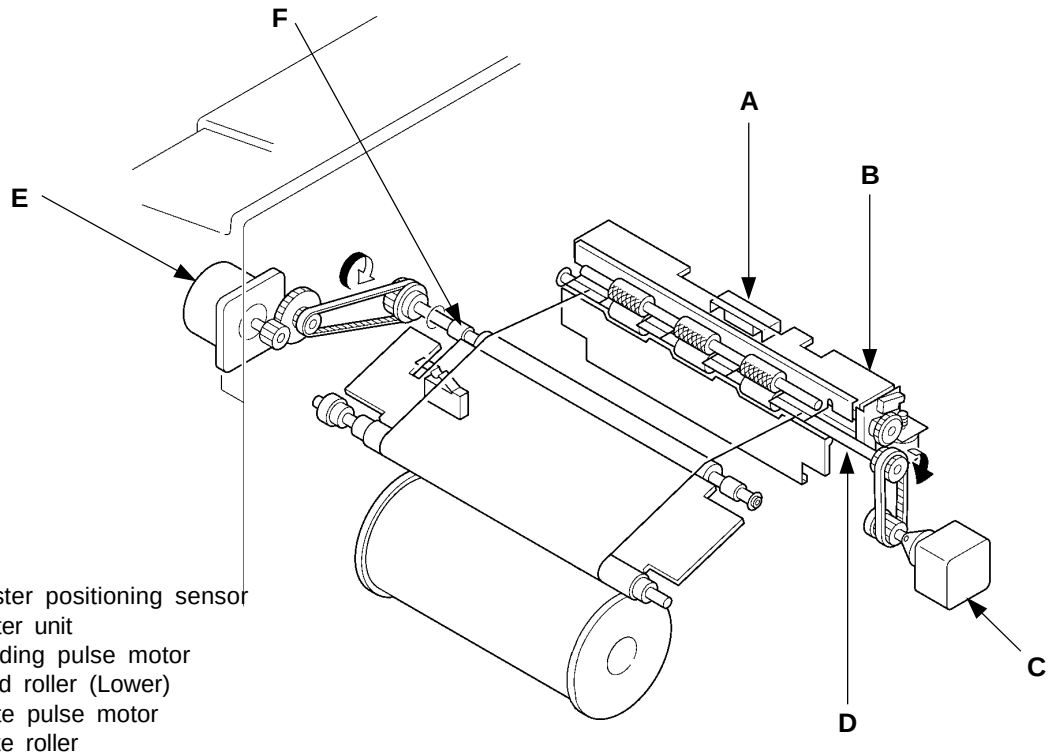
When the Write pulse motor is activated, the Write roller is rotated via pulleys and belts and start to feed master material.

- Function of Loading Pulse Motor

The Loading pulse motor drives the Load roller (lower) via pulleys and a belt, and feed the oncoming master material further with the Load roller (upper), which is driven by the Load roller lower).

- Finish of Post-Cutting Feeding

As the leading edge of master material is detected by the Master positioning sensor, the Write pulse motor and Loading pulse motor are deactivated **22 pulses** later.
At the same time they are deactivated, the Thermal pressure motor is activated to raise the Thermal print head until the TPH home postion switch is actuated ON.

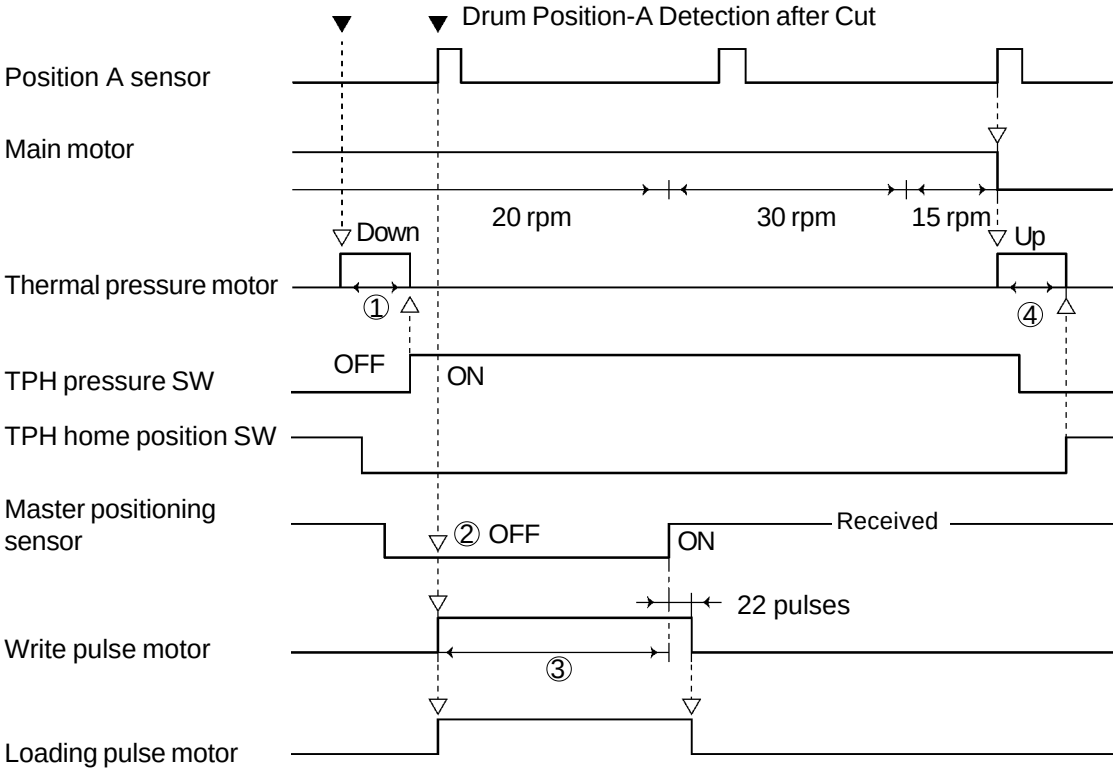


A: Master positioning sensor
B: Cutter unit
C: Loading pulse motor
D: Load roller (Lower)
E: Write pulse motor
F: Write roller

THEORY OF OPERATION

Test Mode No.15 Master positioning sensor
– Light up when reflected light detected
No.65 Write pulse motor
No.66 Loading pulse motor

Master Post-Cutting Feed Timing Chart



① If the TPH pressure switch has not been pressed within 4 seconds after the Thermal pressure motor is activated, the machine assumes the Thermal pressure motor has locked and displays the error code **[T19]**.

② If the Master positioning sensor detects master material , the machine assumes a Master cutting error has occurred and proceeds to a recovering action.

③ If the Master positioning sensor has not detected the leading edge of master material within 1,574 pulses after the Write pulse motor and Loading pulse motor start, the machine assumes the master mis-feed has occurred and displays the error message **"MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL"**.

④ The Thermal print head is not raised if another original is set on the Original feed tray.

4. Post-Master-Miscut Operation

- Detection of Master Cut Error

If the Master positioning sensor detects master material at the Home position A after master cutting operation in loading a master on the Drum, the machine assumes a master cut error has occurred. (*Refer to Fig.1*.)

- Retrial of Master Cutting Operation

When a master cut error occurs, the Thermal pressure motor is activated to raise the Thermal print head until the TPH home position switch is pressed, and the Drum continues to rotate. When the Drum comes to the Position C-1, the Cutter motor is reactivated. (*Refer to Fig.2*.)

- Recheck of Master Cut Error

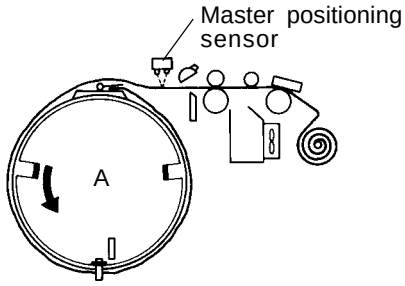
The Master positioning sensor checks the result of the master cutting operation again when the Drum comes to the Position C-2. (*Refer to Fig.3 & 4*.)

If the Master positioning sensor does not detect master material, the machine assumes that the master has been cut and activates the Thermal pressure motor to lower the Thermal print head until the TPH thermal pressure switch is pressed, in order to feed master material.

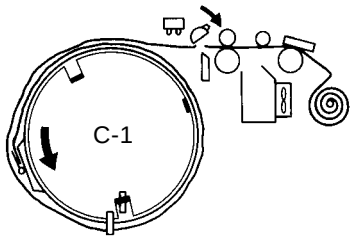
When the Drum returns to the Home position A, the Write pulse motor and Loading pulse motor are activated to feed the leading edge of the master material up to the Master positioning sensor.

If the Master positioning sensor detects master material, on the contrary, the machine assumes that the Cutter motor has locked and indicates the error code **[T13]** when the Drum returns to the Home position A.

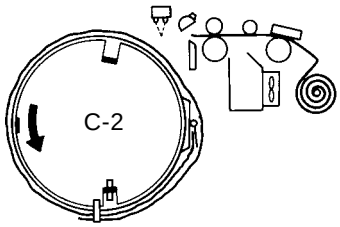
[Fig.1]



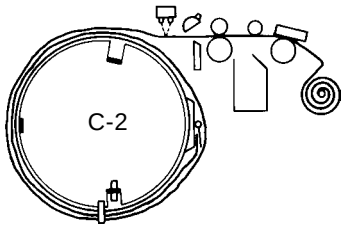
[Fig.2]



[Fig.3]

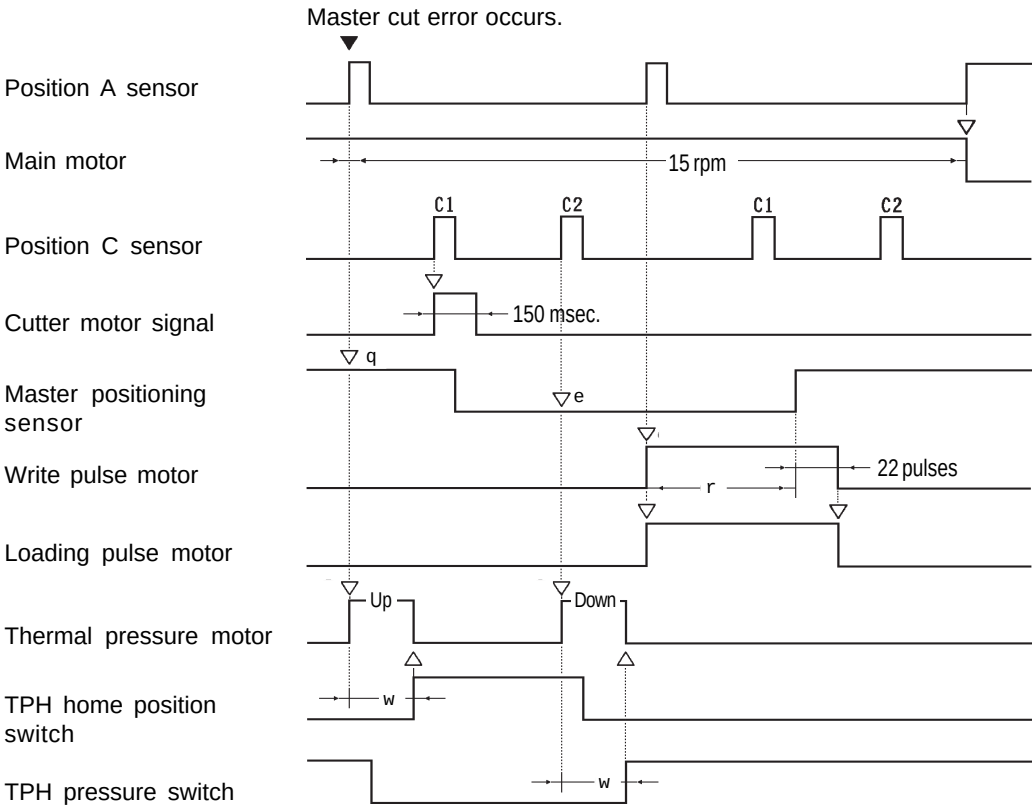


[Fig.4]



- Timing Chart -

Post-Master-Miscut Operation



① As the Master positioning sensor detects master material, the machine assumes a master cut error has occurred.

② If the TPH home position switch or TPH pressure switch has not been pressed **within 4 seconds** after the Thermal pressure motor is activated, the machine assumes the Thermal pressure motor has locked and displays the error code **[T19]**.

③ When the Drum reaches the Position C-2, if the Master positioning sensor detects master material, the machine assumes that the Cutter motor has locked and displays the error code **[T13]**.
If the Master positioning sensor detects no master material, however, the machine assumes that the master has been cut at the second time and continues to feed master material until its leading edge passes under the Master positioining sensor. On the operation panel, on the other hand, the **"MASTER CUT ERROR REMOVE DRUM AND CHECK MASTER"** is displayed because there was a master cut error at the first time.

④ If the Master positioning sensor has not detected the leading edge of master material **within 787 pulses** after the Write pulse motor and Loading pulse motor start, the machine assumes the master mis-feed has occurred and **"MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL"** is displayed.

MEMO

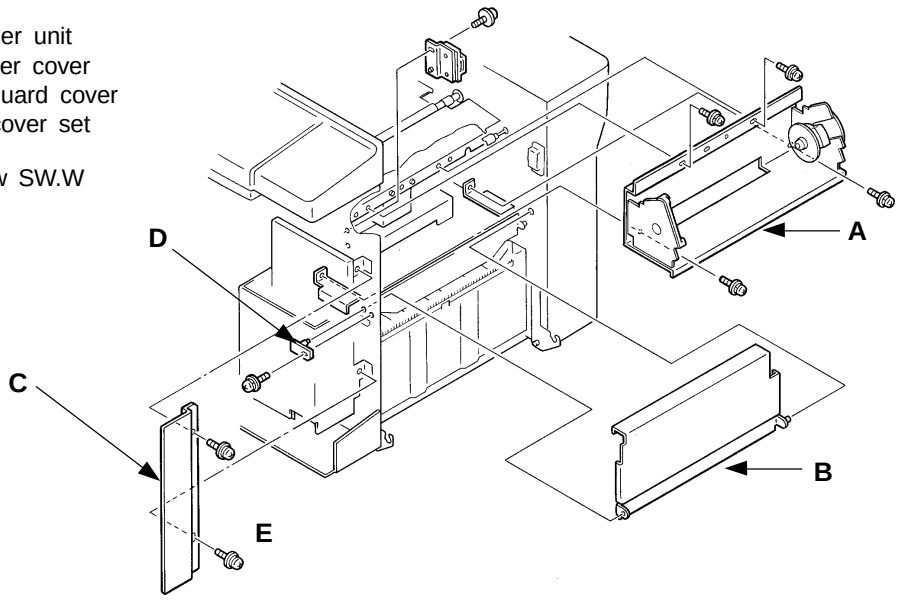
REMOVAL & ASSEMBLY

1. Loading Fan <B4/A4/Legal>

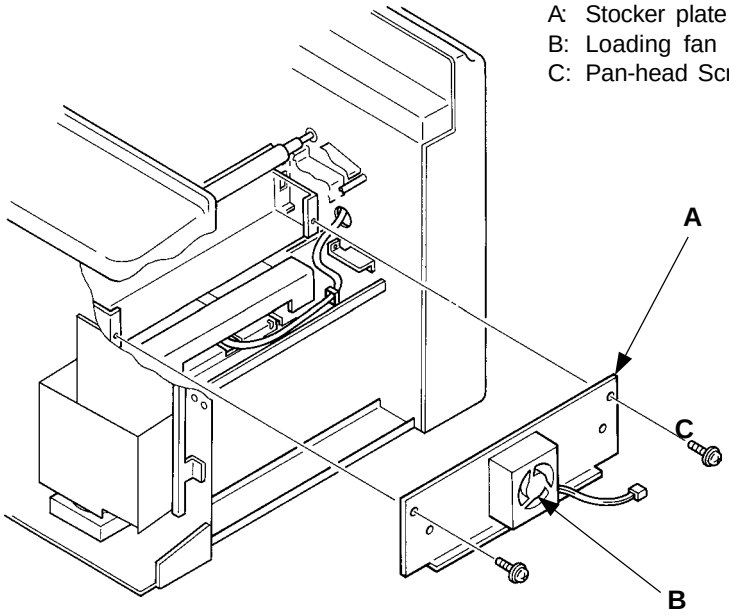
< Removal Procedure >

1. Turn OFF the power, and remove the Front right cover.
2. Remove two mounting screws on the Power supply guard cover, and remove the cover.
3. Remove the mounting screw on the Master holder cover set plate, and remove the plate.
4. Remove four mounting screws on the Master roll holder unit , and remove the unit.
5. Disconnect the connector of the Loading fan and remove two mounting screws of the stocker plate A.

A: Master roll holder unit
B: Master roll holder cover
C: Power supply guard cover
D: Master holder cover set plate
E: Pan-head Screw SW.W M4x6



A: Stocker plate A
B: Loading fan
C: Pan-head Screw SW.W M4x6



MEMO

CHAPTER 18: SC CONTROLLER SECTION

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1. SPECIFICATIONS

1-1. Specification

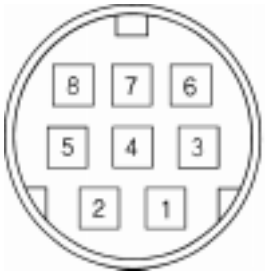
Item	
Host Compatibility	IBM compatible, Macintosh(*1) compatible
Operating Systems	Mac OS7.5, Mac OS7.6, Mac OS8.0, Mac OS8.1, Mac OS8.5, Windows3.1, Windows95/98, Windows NT4.0
Interface Ports	Parallel (IEEE1284B receptacle), Serial (RS-422)
Protocol	IEEE1284 Compatible, RS-422
Autoswitching	Printing port and protocol
Printer Languages	RisoRinc
Interface Unit Type	Built-In type (Inside of FR3950α)
RAM	8MB standard and one free slot (Max. 40MB with optional RAM)
Power Requirements	100 to 240VAC, 50/60Hz (Depending on the Risograph Model)
Power Consumption	20W
Operation Temperature	41F to 104F(5C to 40C)
Operation Humidity	40% to 70%(No dew condensation)
Resolution	Input: 400 dpi/ Output: 400dpi
Control Button	START, STOP and FUNCTION, UP and DOWN Buttons (5 buttons)
Indicator	Three LED's and a LCD for SC Controller
Margin Assignment	Top/bottom and left/right : 3mm(0.118 inch) or greater Check
Paper Size Range	Max. 297 x 432mm or 11.693 x 17.008 inch Min. 10 x 10mm or 0.394 x 0.394 inch

*1 - Can not connect with newer Mac Hardware such as iMac nor new G3 Macintosh which does not have RS-422 Serial Port.

1-2. Port Specification

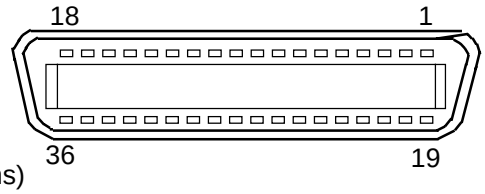
A. Host (SERIAL) connector

- MAC (SERIAL)
  - Mac printer cable system : 57.6Kbps
  - LocalTalk cable system : 230.4Kbps
- Input/Output Specifications
  - Input : RS-422 receiver or equivalent
  - Output : RS-422 driver or equivalent
- Pin Configuration
  - See on the right figure



NOTE : Timing and other details are not published

B. Host (PARALLEL) connector
- Pin Configuration



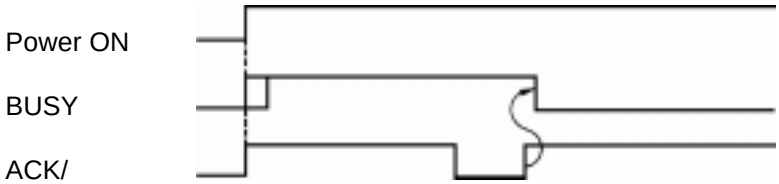
- Interface signals (Centronics interface specifications)

Pin No.	Signal	Source	Function
1	DATASTROBE/	H	Data read synchronizing signal. When this signal is LOW, the FR3950α SC Controller takes in data.
2	DATA1	Bi-Di	Represents data bit 1.
3	DATA2	Bi-Di	Represents data bit 2.
4	DATA3	Bi-Di	Represents data bit 3.
5	DATA4	Bi-Di	Represents data bit 4.
6	DATA5	Bi-Di	Represents data bit 5.
7	DATA6	Bi-Di	Represents data bit 6.
8	DATA7	Bi-Di	Represents data bit 7.
9	DATA8	Bi-Di	Represents data bit 8.
10	ACK/	P	Indicates that all data have been acknowledged when LOW.
11	BUSY	P	Indicates that the SC Controller is busy and cannot receive data when HIGH.
12	PE	P	Indicates the absence of paper in the printer when HIGH.
13	SELECT	P	Indicates whether the SC Controller is selected or not.
14	AF	H	Reserved for future expansion.
15	NC*		Underfined or reserved for future expansion.
16	GND		Signal ground
17	FG		Frame ground
18	5V	P	+5V power supplied from the SC Controller through a 4.2k1/2 resistor.
19	GND		nStrobe signal ground
20	GND		Data 1 signal ground
21	GND		Data 2 signal ground
22	GND		Data 3 signal ground
23	GND		Data 4 signal ground
24	GND		Data 5 signal ground
25	GND		Data 6 signal ground
26	GND		Data 7 signal ground
27	GND		Data 8 signal ground
28	GND		nAck signal ground
29	GND		Busy signal ground
30	GND		pError signal ground
31	INPUT PRIME/	H	Restores the SC Controller into the initial status (compatibility mode) when HIGH.
32	FAULT/	P	Notifies the presence or absence of an error in the SC Controller to the external device(host).
33	NC*		Underfined or reserved for future expansion.
34	NC*		Underfined or reserved for future expansion.
35	NC*		Underfined or reserved for future expansion.
36	SELECT IN/	H	Used by the external device (host) to select the SC Controller. When this signal is LOW, the SC Controller is selected.

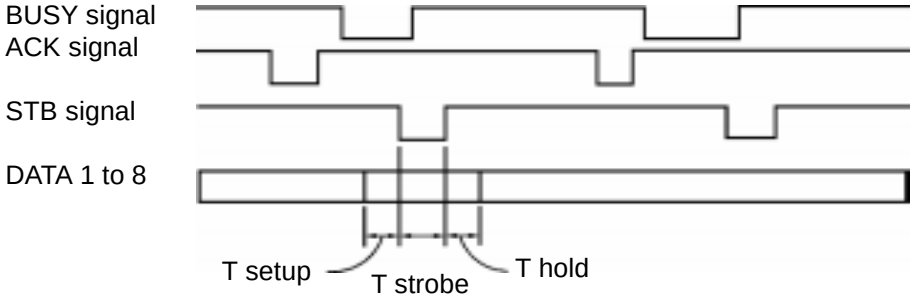
NC* stands for no connection
H stands for Host and P means the SC Controller

- Timing Charts

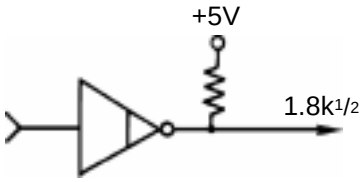
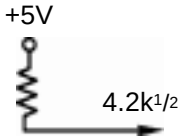
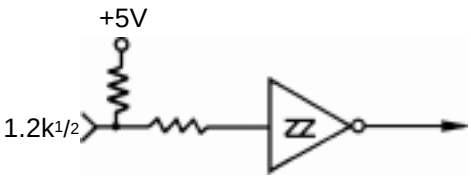
When the power is turned on;



When data is received;



- Electrical Characteristics

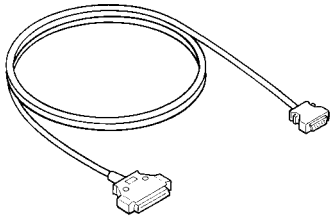
Signal	Circuit	Remarks
nAck Busy pError Select nFault		-Open collector LS06 or equivalent -IEEE 1284 level 1 or equivalent
Peripheral Logic Hight		Connected to the +5V source within the SC Contoller through a 4.2k1/2 resistor
nStrobe Data 1 to 8 nInt nAutoFd nSelection		-Schmidt buffer LS14 or equivalent -IEEE 1284 level 1 or equivalent (input capacity varies)

2. INSTALLATION

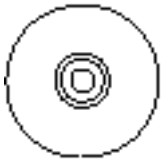
2-1. Checking Package Contents

Check that your FR3950α package contains the items mentioned below.

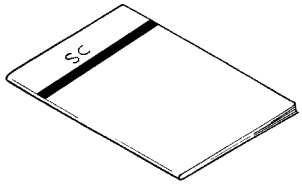
- SC II Cable (10m) 1pce
- Local Interface User`s Guide 1copy
- CD-ROM (Printer Drivers & Utilities) 1pce



SCII Cable



CD-ROM



Local Interface User`s Guide

2-2. Computer Systems Requirements

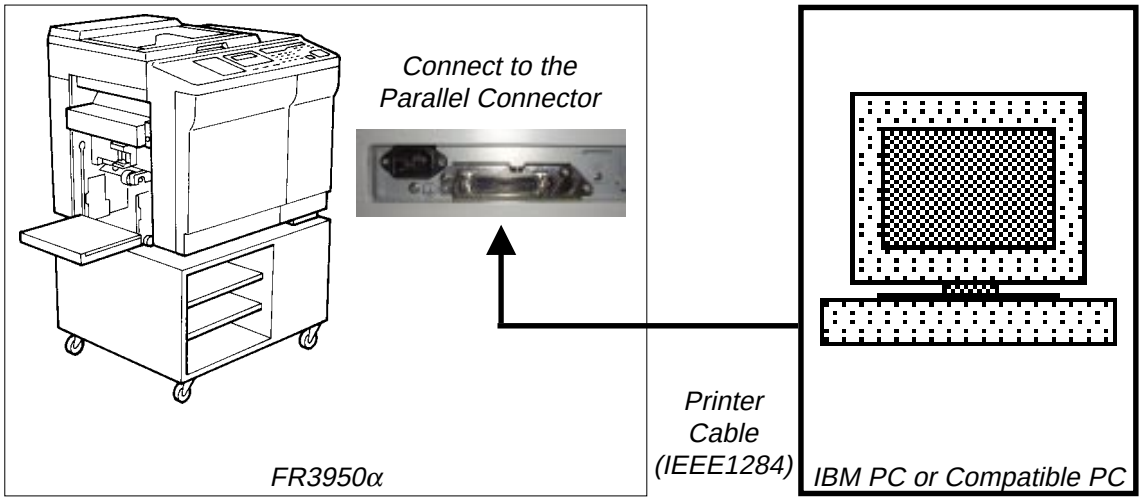
- Windows Platform
  - IBM PC or compatible
    - > Centronics or IEEE 1284 parallel port
    - > CD-ROM Drive for the software installation
    - > Windows 3.1 or Windows 95/98 or Windows NT4.0 installed

- Macintosh Platform
  - Apple Macintosh
    - > CD-ROM Drive for the software installation
    - > Hard disk with minimum 256kB free space for the softwares
    - > Minimum 12MB installed memory (Main Memory)
    - > Minimum 60MB memory available with installed memory (Main Memory) and extended (Virtual) memory
    - > Mac OS above System 7.5X under System 8.5 installed
    - > QuickDraw installed and enabled
  - Apple Power Macintosh
    - > CD-ROM Drive for the software installation
    - > Hard disk with minimum 256kB free space for the softwares
    - > Minimum 16MB installed memory (Main Memory)
    - > Minimum 60MB memory available with installed memory (Main Memory) and extended (Virtual) memory
    - > Mac OS above System 7.5X under System 8.5 installed
    - > QuickDraw installed and enabled

2-3. Connecting the cables

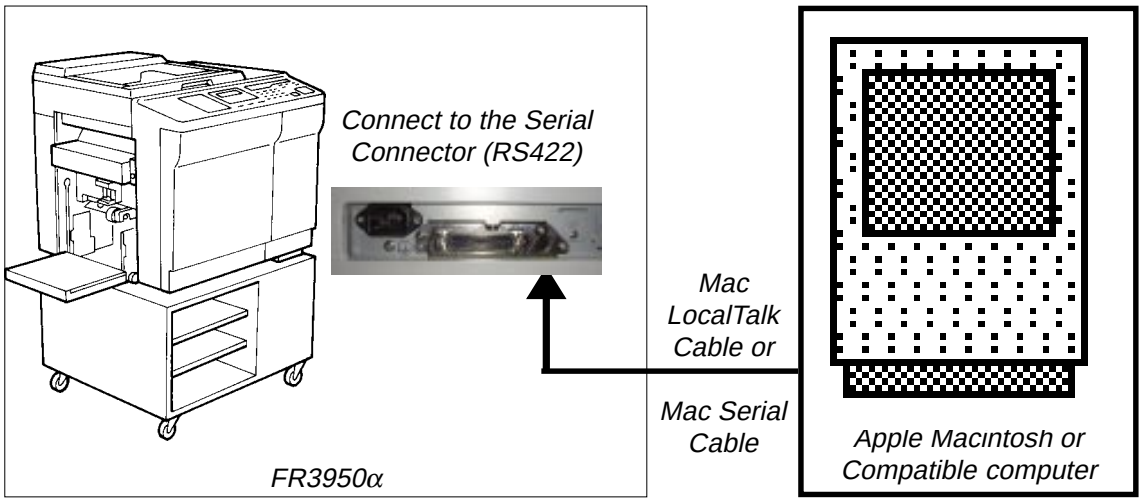
Connect the cables of the FR3950α properly while refering to the figure shown below. Be sure to turn off the Personal Computer and FR3950α when connecting cables.

- With IBM PC or Compatible PC



[NOTE]
Purchase a commercially available printer cable for connecting between the FR3950α and the personal computer.

- With Apple Macintosh or Compatible computer



[NOTE]
Purchase a commercially available Mac serial cable or LocalTalk cable for connecting between the FR3950α and the personal computer.
If the printer port on the Macintosh is already occupied with the LocalTalk cable, use the LocalTalk network for cable connection or connect the Mac serial cable to the modem port.

2-4. Expanding Memory Volume

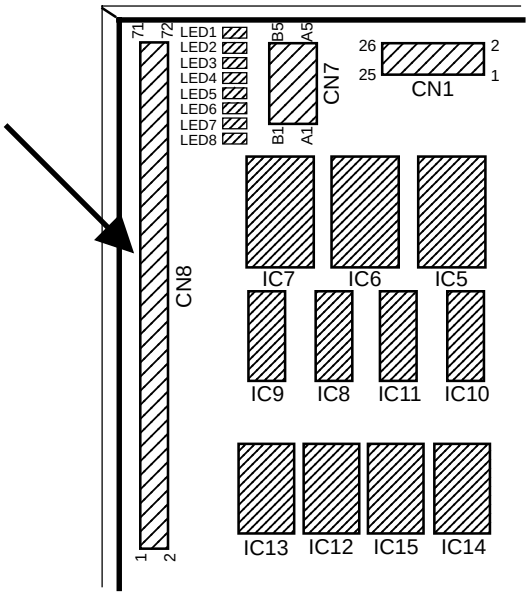
Purpose of Expanding Memory Volume

1. To increase the page data volume.
2. To achieve optional “Remote Mode” function. (Information will be available separately in the future by Technical Bulletin)

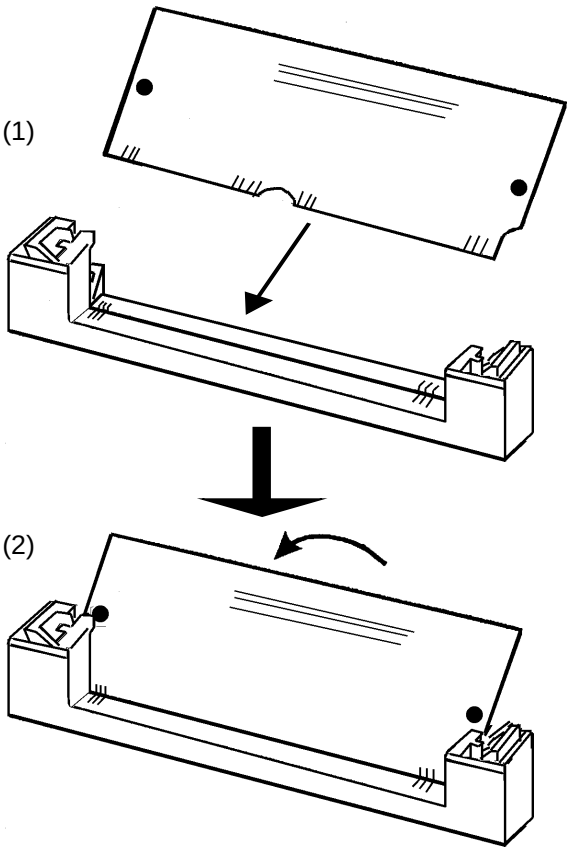
8MB RAM is installed as standard on the SC Main PCB in the FR3950α.
This memory space is used for developing the print data transmitted from the personal computer into page data.
This standard 8MB memory is enough memory to develope two A3-size documents in 400dpi resolution.
This memory volume can be expanded up to 40MB by installing an optional RAM (32MB) on the SC Main PCB in order to achieve the above purpose.

How to install the Optional RAM

1. Turn off the power on the FR3950α and SC Contoroller, then unplug the power code. If the FR3950α is already connected to other equipment, remove all connected cables.
2. Ground yourself and remove the Front Left Cover from the FR3950α to expose the SC Main PCB (Please refer “Disassemble and Re-Assembly 6-1” for the detail).
3. Install the Optional RAM (32MB) into CN8 socket on the SC Main PCB.
   (1) Hold it at about 60 degree angle against its socket and press its edge connector firmly into the slot running through the center of the socket.
   (2) Then pivot the RAM up. You will hear a click as the plastic tabs at each end of the socket snap into place around the RAM and then the small plastic projection snap into the holes at each of the RAM.



SC Main PCB



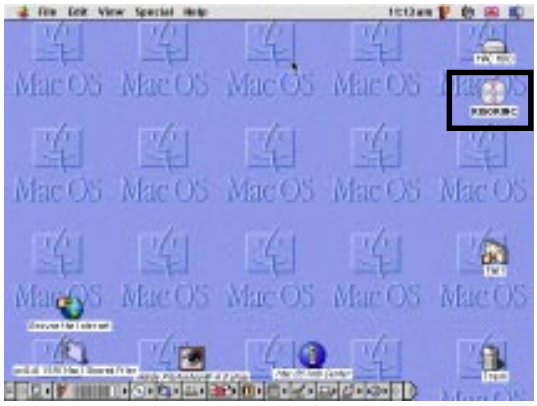
3. INSTALLATION (SOFTWARE-DRIVERS)

3-1. Macintosh (OS 8.1)

(A) Turn on the Macintosh computer and start Mac OS.

(B) Insert driver CD-ROM in the Macintosh.
"**RISORINC**" icon appears on the screen.

(C) Double-click on "**RISORINC**" icon.



(MacOS8 inst1)

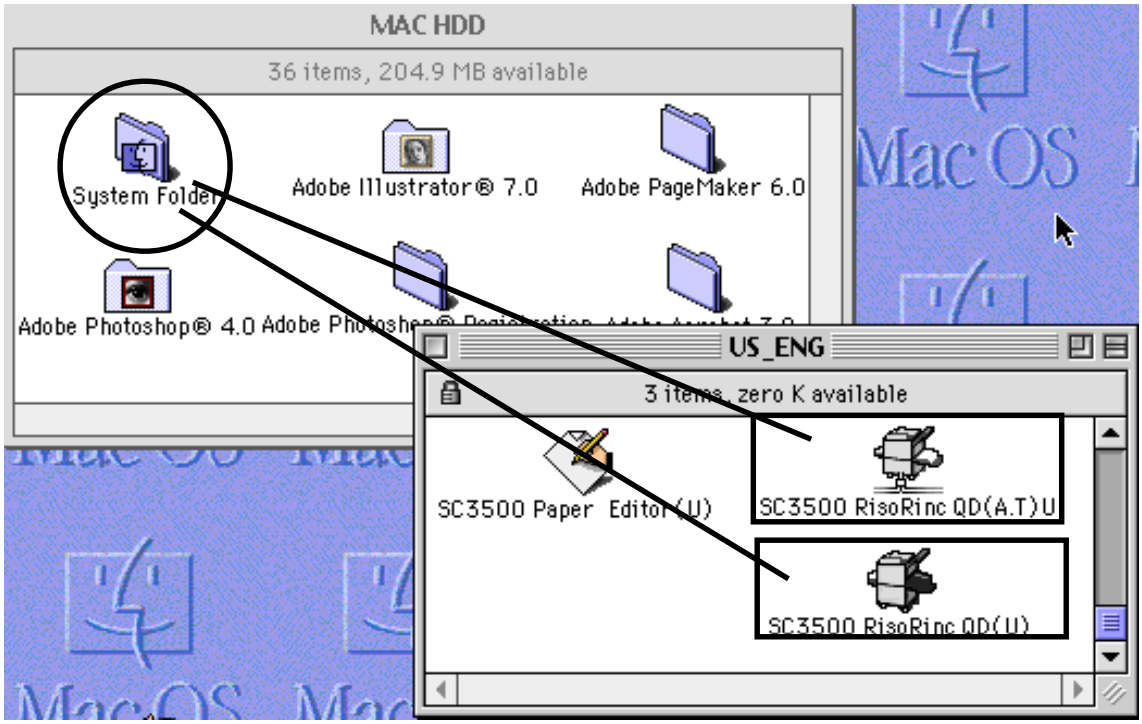
(D) "**RISORINC**" appears on the display.
To install US English version, double click on "**US_ENG**" icon.

(MacOS8 inst2)

(E) "**US_ENG**" appears on the display.

(MacOS8 inst3)

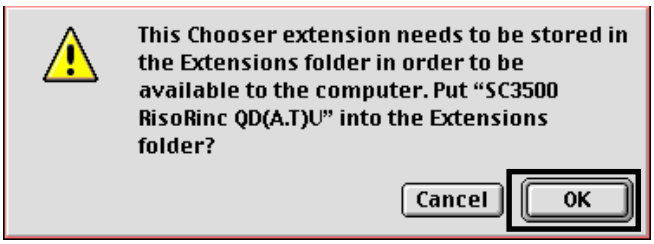
(F) Drug **[SC3500 RisoRinc QD(A.T)U]** icon or **[SC3500 RisoRinc QD(U)]** icon and drop this icon on **[System Folder]**icon in the MAC HDD.



(MacOS8 inst4)

Note : If you want to connect Macintosh with FR3950α by using,
Serial Cable - Copy **[SC3500 RisoRinc QD(U)]** icon to System Folder.
LocalTalk Cable - Copy **[SC3500 RisoRinc QD(A.T)U]** icon to System Folder.

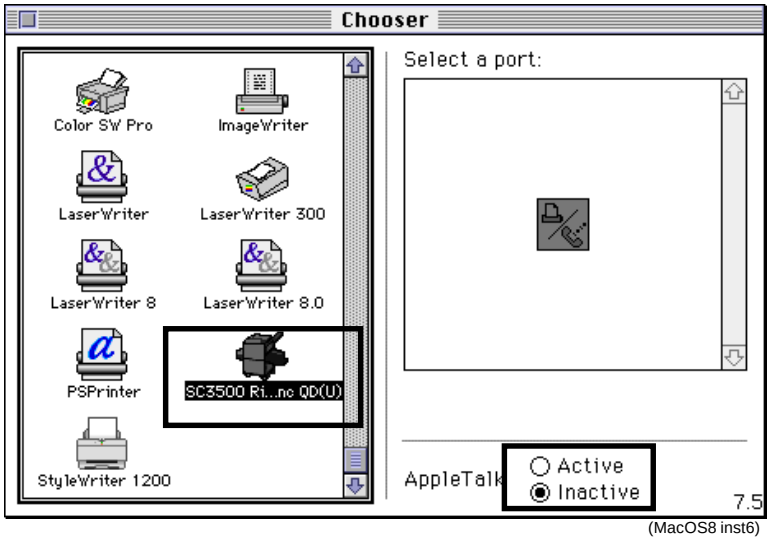
(G) Following dialog box appears on the display. Click on the **[OK]** button.


This Chooser extension needs to be stored in the Extensions folder in order to be available to the computer. Put "SC3500 RisoRinc QD(A.T)U" into the Extensions folder?
Cancel
OK

(MacOS8 inst5)

(H-1) **- Serial Cable connection -**

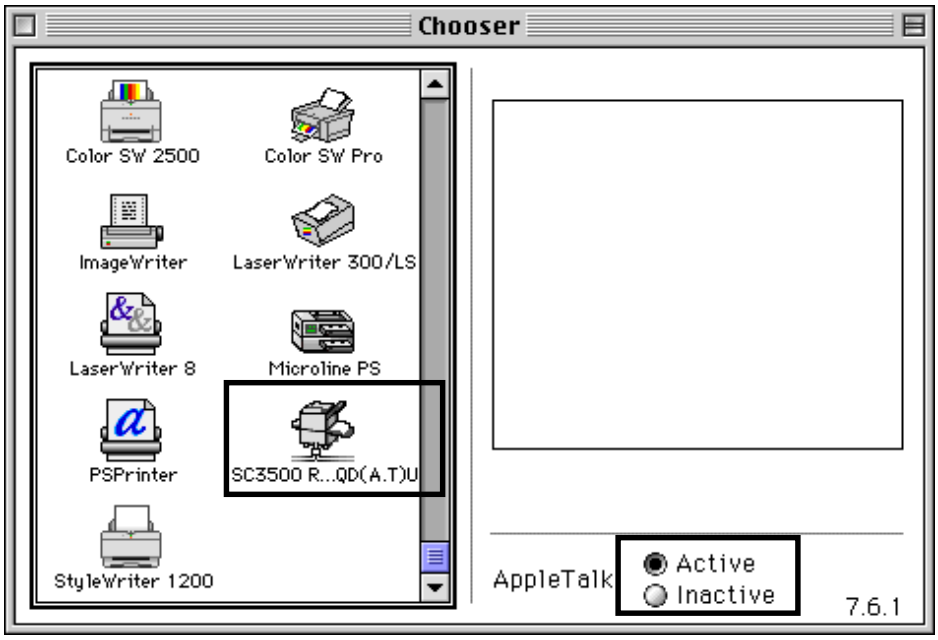
Select **[Chooser]** from the **[Apple]** menu. The **[Chooser]** dialog box then appears. Select AppleTalk section to "Inactive", then click on **[SC3500 Ri...nc QD(U)]** icon to finish installation.



(MacOS8 inst6)

(H-2) **- LocalTalk Cable connection -**

Select **[Chooser]** from the **[Apple]** menu. The **[Chooser]** dialog box then appears. Select AppleTalk section to "Active", then click on **[SC3500 R...QD(A.T)U]** icon to finish installation.



(MacOS8 inst7)

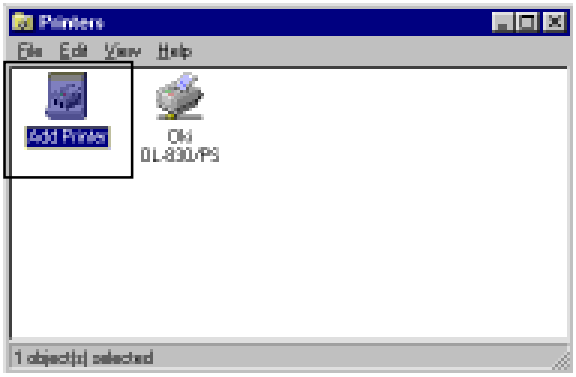
3-2. Windows95/98

(A) Turn on the personal computer and start Windows 95/98.
Insert the software CD-ROM in the CD-ROM drive.

(B) Open the **[My Computer]**.

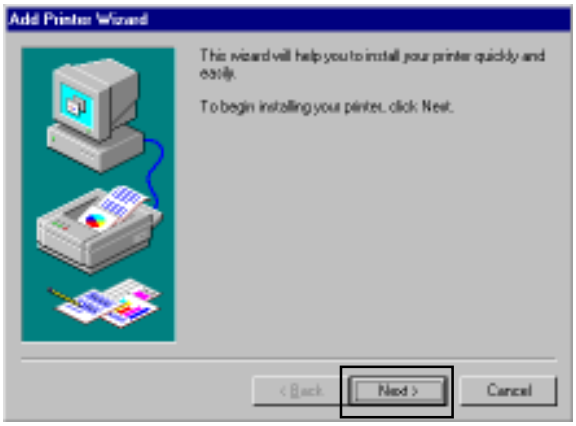
(C) Double-click on the **[Printers]** icon.
[Printers] dialog box appears on the display.

(D) Double-click on the **[Add Printer]** icon.

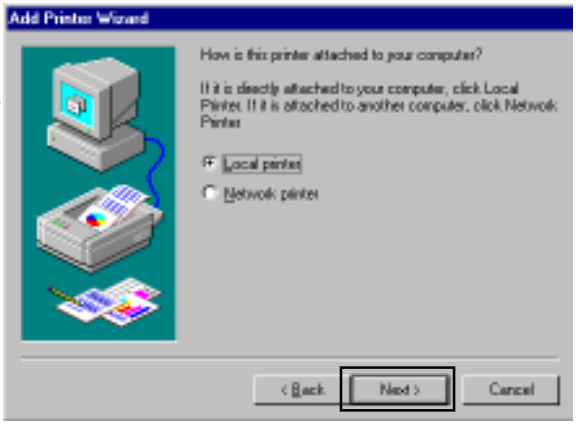


(FRSC95 inst01)

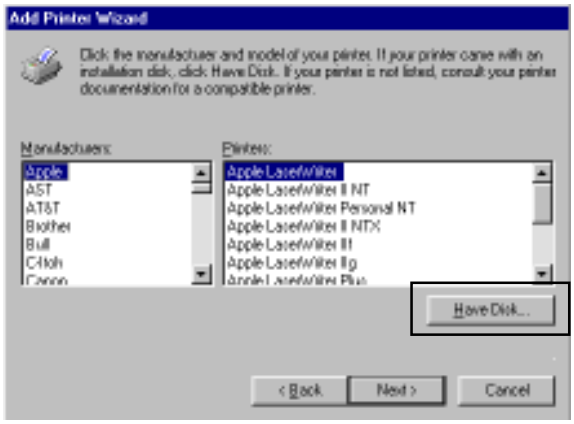
(E) **[Add Printer Wizard]** dialog box appears on the display.
Click on the **[Next]** button.


Add Printer Wizard
This wizard will help you to install your printer quickly and easily.
To begin installing your printer, click Next.
< Back
Next >
Cancel
(FRSC95 inst02)

(F) Click on the **[Next]** button.
If you need to install the printer as Network printer, change mark in Network printer box.

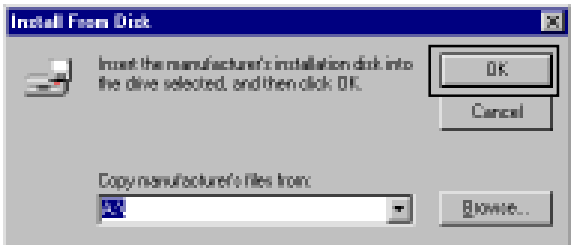

Add Printer Wizard
How is this printer attached to your computer?
If it is directly attached to your computer, click Local Printer. If it is attached to another computer, click Network Printer.
Local printer
Network printer
< Back
Next >
Cancel
(FRSC95 inst03)

(G) Click on the **[Have Disk...]** button.



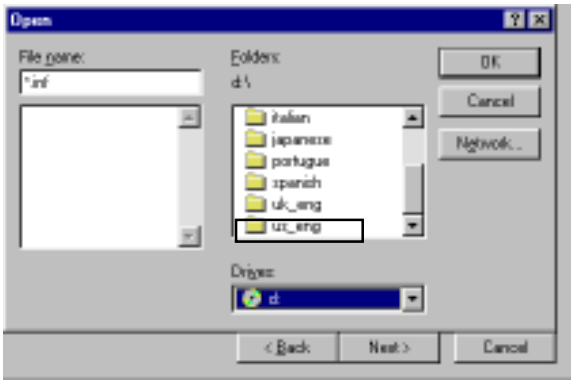
(FRSC95 inst04)

(H) Click on the **[OK]** button.



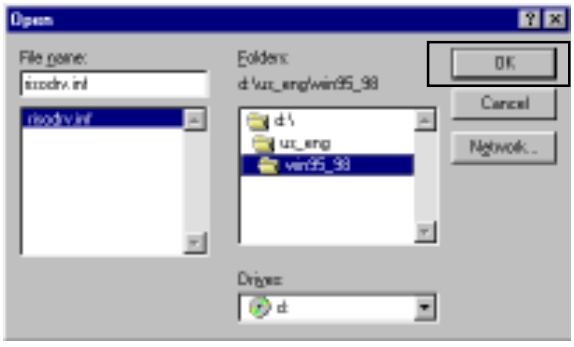
(FRSC95 inst05)

(I) **[Open]** dialog box appears on the display.
Double click on the **[us_eng]** folder.



(FRSC95 inst06)

(J) Click on the **[OK]** button.

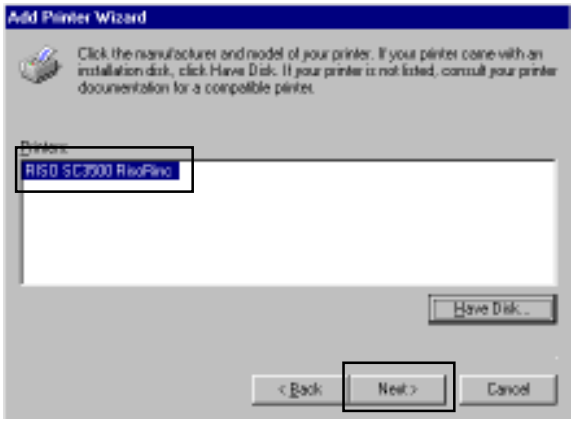


(FRSC95 inst07)

(K) Click on the **[OK]** button.

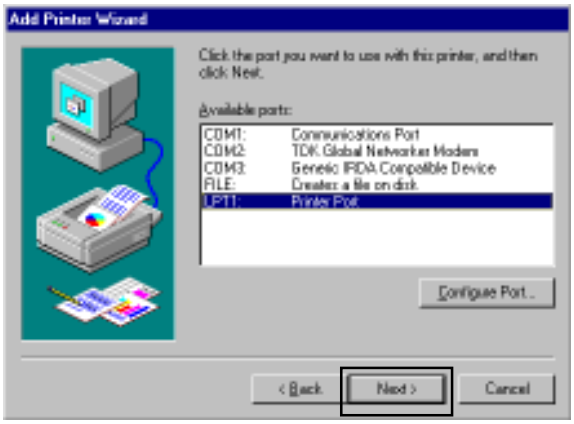
(FRSC95 inst08)

(L) **[RISO SC3500 RisoRinc]** appears in the Printers column.
Then click on the **[Next]** button.


Add Printer Wizard
Click the manufacturer and model of your printer. If your printer came with an installation disk, click Have Disk. If your printer is not listed, consult your printer documentation for a compatible printer.
Printers:
RISO SC3500 RisoRinc
Have Disk...
< Back
Next >
Cancel

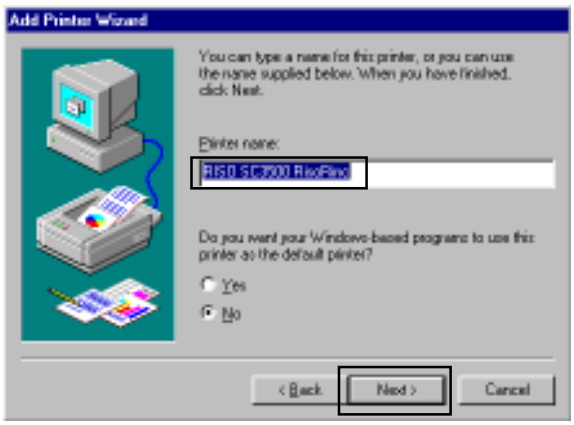
(FRSC95 inst09)

(M) Click on the **[Next]** button.


Add Printer Wizard
Click the port you want to use with this printer, and then click Next.
Available ports:
COM1: Communications Port
COM2: TDK Global Networker Modem
COM3: Generic IRDA Compatible Device
FILE: Creates a file on disk
LPT1: Printer Port
Configure Port...
< Back
Next >
Cancel

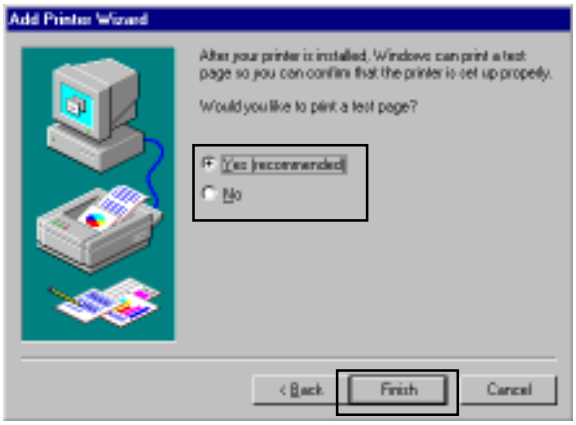
(FRSC95 inst10)

(N) **[RISO SC3500 RisoRinc]** appears in the Printers name box.
Then click on the **[Next]** button.


Add Printer Wizard
You can type a name for this printer, or you can use the name supplied below. When you have finished, click Next.
Printer name:
RISO SC3500 RisoRinc
Do you want your Windows-based programs to use this printer as the default printer?
Yes
No
< Back
Next >
Cancel

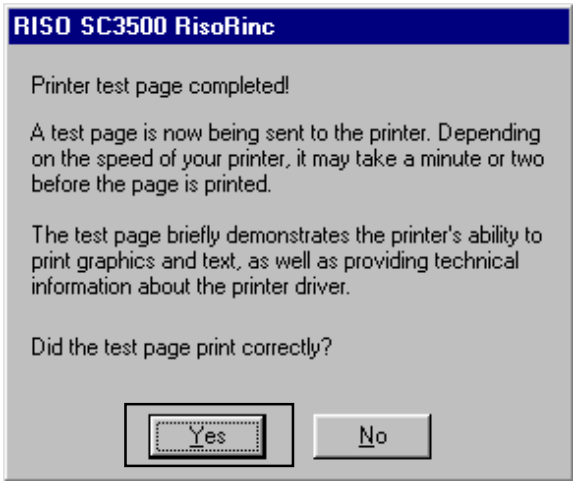
(FRSC95 inst11)

(O) If you need to have a test print of Windows 95 printer settings, click on the **[Finish]** button.


Add Printer Wizard
After your printer is installed, Windows can print a test page so you can confirm that the printer is set up properly.
Would you like to print a test page?
Yes (recommended)
No
< Back
Finish
Cancel

(FRSC95 inst12)

(P) If the test print of Windows 95 printer settings comes out correctly from the printer, click on the **[Yes]** button.


RISO SC3500 RisoRinc
Printer test page completed!
A test page is now being sent to the printer. Depending on the speed of your printer, it may take a minute or two before the page is printed.
The test page briefly demonstrates the printer's ability to print graphics and text, as well as providing technical information about the printer driver.
Did the test page print correctly?
Yes
No

(FRSC95 inst13)

(Q) **[RISO SC3500 RisoRinc]** appears in the **[Printers]** box, installation finished.

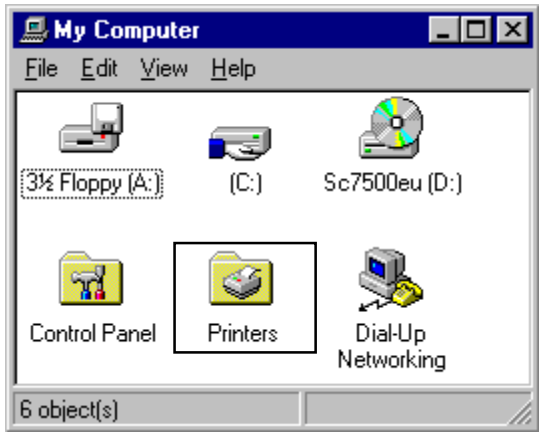
(FRSC95 inst14)

3-3. Windows NT4.0

(A) Turn on the personal computer and start Windows NT 4.0.
Insert the software CD-ROM in the CD-ROM drive.

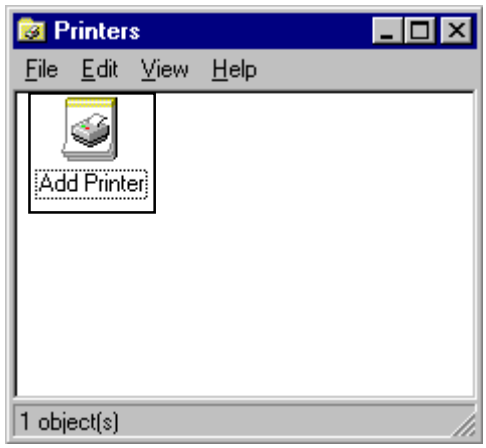
(B) Open the **[My Computer]**.

(C) Double-click on the **[Printers]** icon.



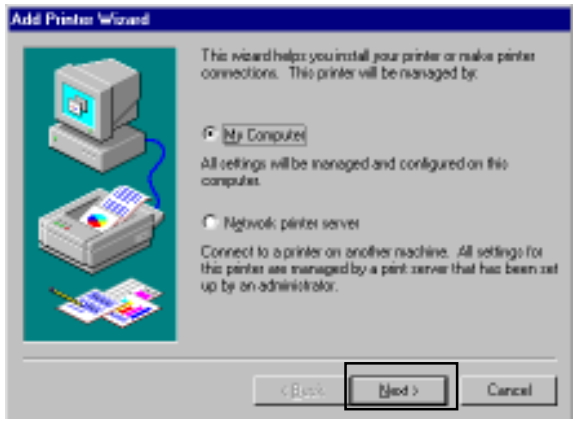
(FRSCNT inst01)

(D) Double-click on the **[Add Printer]** icon.



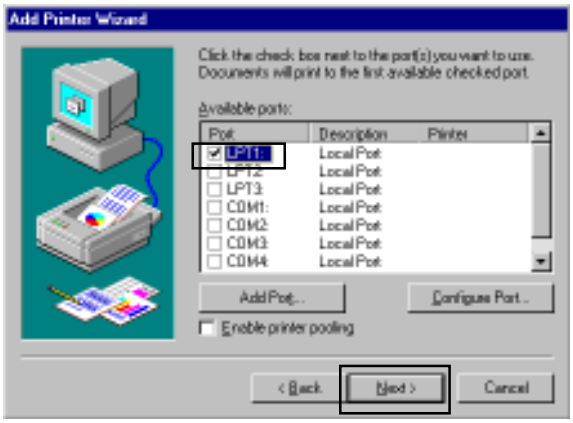
(FRSCNT inst02

(E) If you install SC unit as local printer, click on the **[Next]** button.


Add Printer Wizard
This wizard helps you install your printer or make printer connections. This printer will be managed by:
My Computer
All settings will be managed and configured on this computer.
Network printer server
Connect to a printer on another machine. All settings for this printer are managed by a print server that has been set up by an administrator.
< Back
Next >
Cancel

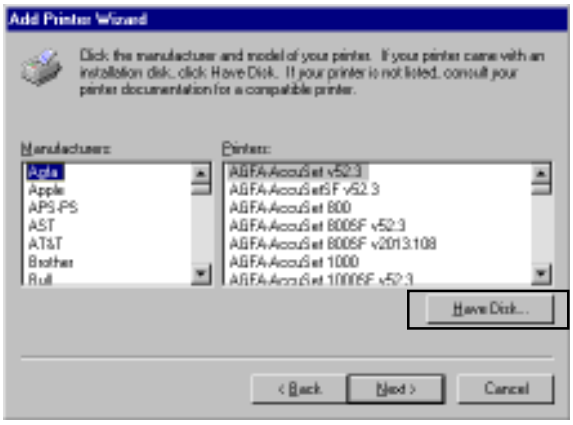
(FRSCNT inst03)

(F) Mark in the "LPT1" port (Suggest port) column, then click on the **[Next]** button.



(FRSCNT inst04)

(G) Click on the **[Have Disk...]** button.

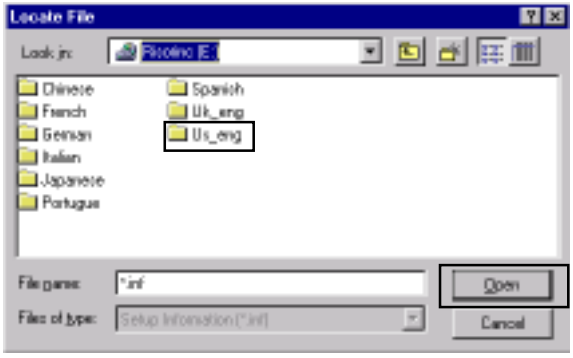


(FRSCNT inst05)

(H) **[Install From Disk]** dialog box appears. Click on the **[OK]** button.

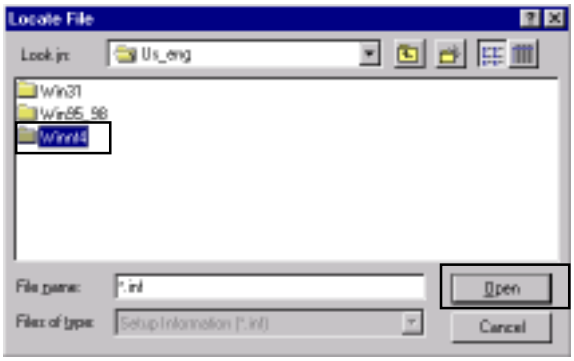
(FRSCNT inst06)

(I) Select the **[Us_eng] folder** then click on the **[Open]** button.



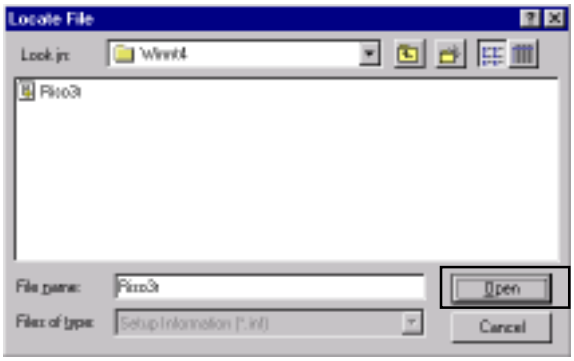
(FRSCNT inst07)

(J) Click on the **[Open]** button.



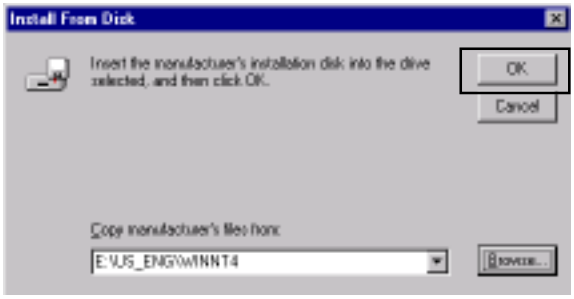
(FRSCNT inst08)

(K) Click on the **[Open]** button.



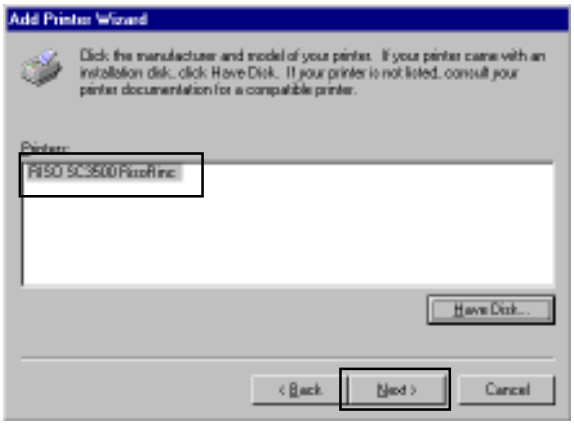
(FRSCNT inst09)

(L) Click on the **[OK]** button.



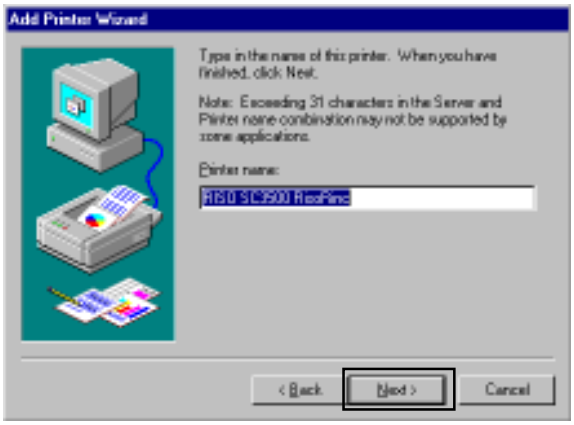
(FRSCNT inst10)

(M) **[RISO SC3500 RisoRinc]** appears in the Printers column.
Then click on the **[Next]** button.


Add Printer Wizard
Click the manufacturer and model of your printer. If your printer came with an installation disk, click Have Disk. If your printer is not listed, consult your printer documentation for a compatible printer.
Printers:
RISO SC3500 RisoRinc
Have Disk...
< Back
Next >
Cancel

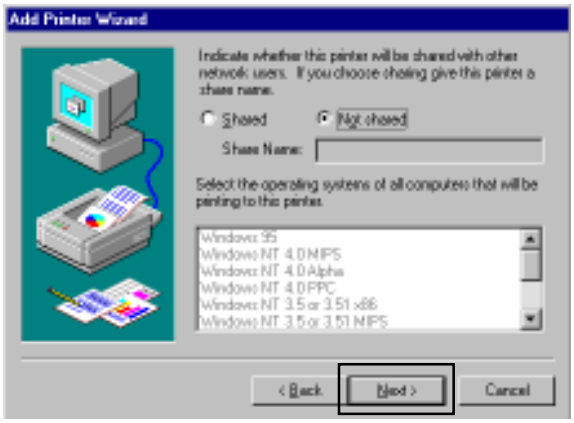
(FRSCNT inst11)

(N) **[RISO SC3500 RisoRinc]** appears in the Printer name.
Then click on the **[Next]** button.


Add Printer Wizard
Type in the name of this printer. When you have finished, click Next.
Note: Exceeding 31 characters in the Server and Printer name combination may not be supported by some applications.
Printer name:
RISO SC3500 RisoRinc
< Back
Next >
Cancel

(FRSCNT inst12)

(O) Click on the **[Next]** button.


Add Printer Wizard
Indicate whether this printer will be shared with other network users. If you choose sharing, give this printer a share name.
Shared
Not shared
Share Name:
Select the operating systems of all computers that will be printing to this printer.
Windows 95
Windows NT 4.0 MIPS
Windows NT 4.0 Alpha
Windows NT 4.0 PPC
Windows NT 3.5 or 3.51 x86
Windows NT 3.5 or 3.51 MIPS
< Back
Next >
Cancel

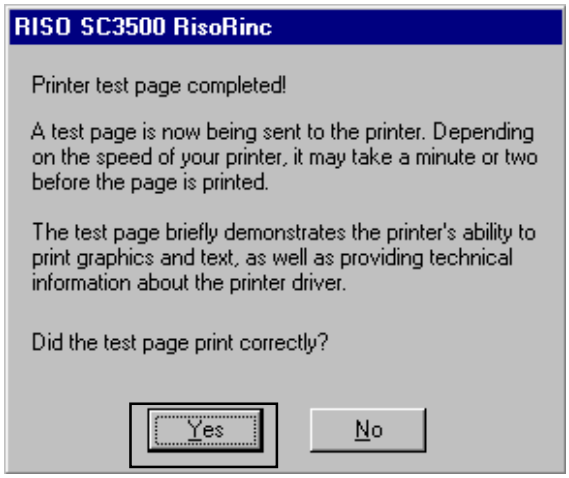
(FRSCNT inst13)

(P) Click on the **[Finish]** button.

Add Printer Wizard
After your printer is installed, you can print a test page so you can confirm that the printer is set up properly.
Would you like to print a test page?
Yes (recommended)
No
< Back
Finish
Cancel

(FRSCNT inst14)

(Q) If the test print of Windows NT printer settings comes out correctly from the printer, click on the **[Yes]** button.


RISO SC3500 RisoRinc
Printer test page completed!
A test page is now being sent to the printer. Depending on the speed of your printer, it may take a minute or two before the page is printed.
The test page briefly demonstrates the printer's ability to print graphics and text, as well as providing technical information about the printer driver.
Did the test page print correctly?
Yes
No

(FRSCNT inst15)

(R) **[RISO SC3500 RisoRinc]** appears in the **[Printers]** box, installation finished.

(FRSCNT inst16)

4. FIRMWARE PROGRAM

4-1. Firmware Program Version Check

The version number of the firmware program can be checked in three different ways, according to the difference of the version number itself, as given below.

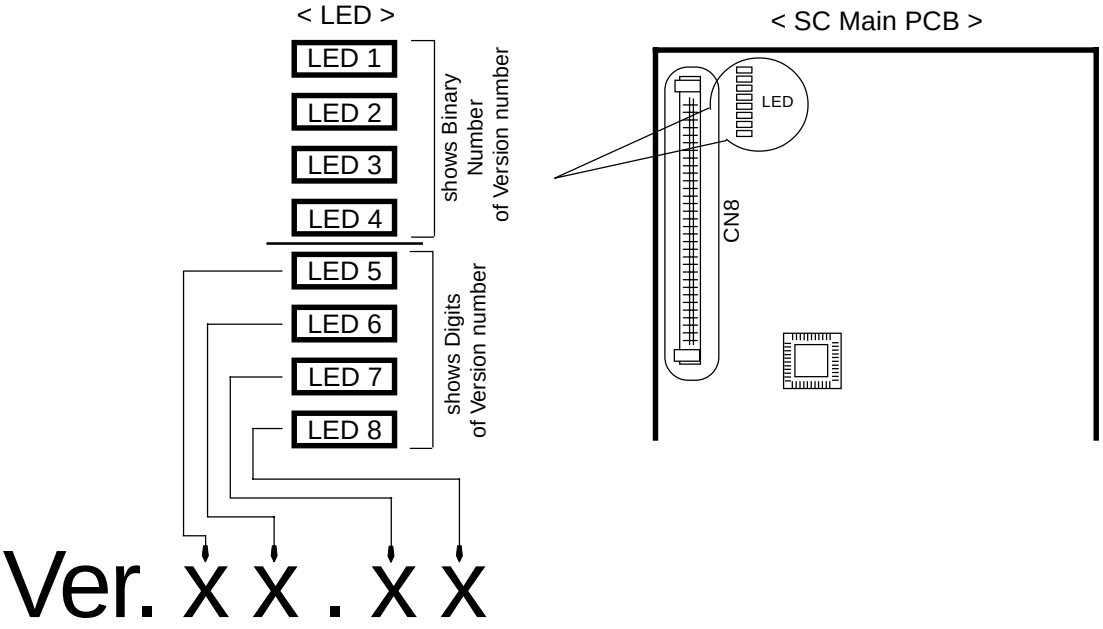
1) The firmware version number was shown on Test Print (Please refer "Trouble Shooting Tips 5-1") for the detail.

2) Check the version number by 8 LED's on the SC Main PCB

- **When the version number is "3.11" ;**

  1) Turn off the Main power and remove the Front Left cover of FR3950α.

  2) Check the illumination sequence of the green LEDs on the SC Main PCB when turning on the SC power.



LED 1 to LED 4

Indicate the numeric value of the version number by the 4-digit binary system.

LED 5 to LED 8

Indicate the digit place of the version number. For example, LED 8 as 2nd digit below the decimal point.

[Example. : LED illumination sequence when the version number is "3.11"]

Sequence	Version No.	LED1	LED2	LED3	LED4	LED5	LED6	LED7	LED8	Version Digit Place
1st	0	OFF	OFF	OFF	OFF	**ON**	OFF	OFF	OFF	2nd place over decimal
2nd	3	**ON**	**ON**	OFF	OFF	OFF	**ON**	OFF	OFF	1st place over decimal
3rd	1	**ON**	OFF	OFF	OFF	OFF	OFF	**ON**	OFF	1st place below decimal
4th	1	**ON**	OFF	OFF	OFF	OFF	OFF	OFF	**ON**	2nd place below decimal

3) Check the version number by 3 LED's on the SC Panel

- **When the version number is "3.11" ;**

1) Turn on the SC power, pressing down the FUNCTION button on the SC panel, and keep it pressed down untill all 3 LED's on the SC panel start flashing.

2) Release the FUNCTION button. The indicators flashes three times and then indicate the version number through their illumination.

3) The first illumination combination of the indicators indicate the 1st over-zero digit of the version number.

4) Press the FUNCTION button again. Next, they indicate the 1st below-zero digit of the same version number.

5) When the FUNCTION button is pressed the third time, then, the 2nd below-zero digit of the number is indicated by them.

6) If the FUNCTION button is pressed once more at this stage, the version number can be checked again from the 1st over-zero digit, as described in the step 3 above.

< Indicator Illumination Table>

Number	ERROR	READY/DATA	PAGE STANDBY
0	OFF	OFF	OFF
1	OFF	OFF	**ON**
2	OFF	**ON**	OFF
3	OFF	**ON**	**ON**
4	**ON**	OFF	OFF
5	**ON**	OFF	**ON**
6	**ON**	**ON**	OFF
7	**ON**	**ON**	**ON**

4-2. Firmware Program Upgrading

The firmware program which controls the operation of the FR3950α SC Controller is stored in the Flash memory on the SC Main PCB inside. This program can be upgraded by downloading a new (upgraded) one, which will be supplied it when required, from the personal computer.

1) Upgrading on Windows 3.1

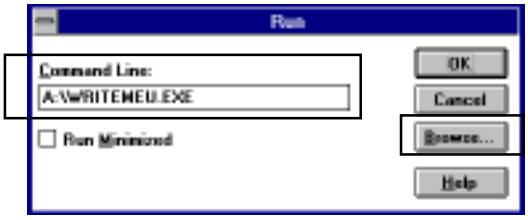
(1) Confirm the FR3950α SC Controller is securely connected to the personal computer which is to be used for program upgrading procedure.
(2) Turn on the FR3950α SC Controller, pressing down the STOP button and the FUNCTION button on the SC panel together, and keep them pressed down until all 3 indicators on the SC panel are illuminated and then the ERROR indicator (orange) goes off among them. Release the buttons.
(3) Turn on the personal computer and start Windows 3.1.
(4) Insert the floppy disk which contains an upgraded firmware program into the floppy disk drive on the personal computer.

NOTE : We must have the utility software which downloads file data in the floppy disk.

(5) Click on [File] in the menu bar in the "Program Manager" window and then on [Run...] in the [File] menu. The [Run] dialog box then appears.

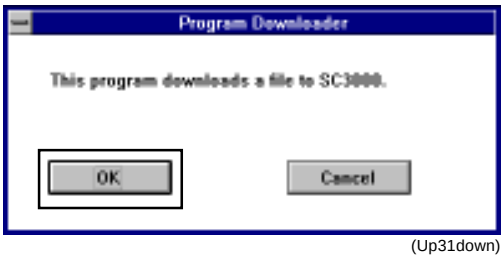
(Up31prom)

(6) Enter "a: \ writemeu.exe" into the [Command Line] box. (If the "C" drive is assigned as floppy disk drive, enter "c: \ writemeu.exe" into this box.)
The above-mentioned file name can be selected from the file name reference list which can be opened by clicking on the [Browse...] button in the [Run] dialog box.



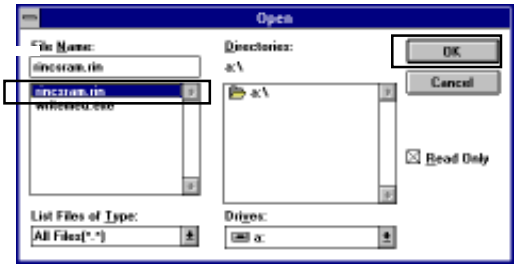
(Up31run)

(7) Confirm the entered file name is correct and click on the [OK] button.
The "downloader" program runs and then the [Program Downloader] dialog box appears.
(8) Click on the [OK] button in this dialog box.
The [Open] dialog box then appears.



(Up31down)

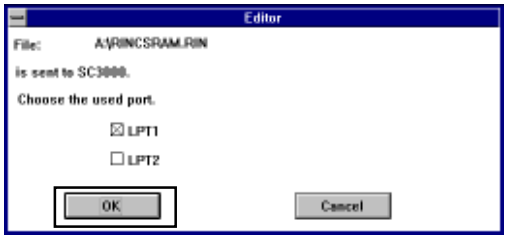
(9) Select "rincsram.rin" from the file name list in this dialog box. In "rincsram.rin", the upgraded firmware program is contained.
(If this file name isn't displayed in the file name list, select "All Files (*.*)" from the [List Files of Type] box in this dialog box.)
(10) Confirm "rincsram.rin" is displayed in the [File Name] box and click on the [OK] button in this dialog box.
The [Editor] dialog box then appears.



(Up31open)

(11)Select the port to which the FR3950α SC Controll is connected, normally "LPT1", and click on the [OK] button in this dialog box.

The message box "Downloading" appears while the READY/DATA indicator (green) on the SC panel is flashing.



(Up31edit)

(12)When it is confirmed the firmware program has been downloaded successfully into the FR3950α SC Controller, the READY/DATA indiactor stop flashing and the PAGE STANDBY indicator starts flashing, while the [Mini Editor] dialog box appears, informing the program has been successfully downloaded.

(Up31mied)

(13)Click on the [OK] button in this dialog box.

Turn off the FR3950α SC Controller and then remove the floppy disk from the floppy disk drive on the personal computer.

[NOTE]

- It is recommended that the version number of the installed firmware program be checked when it is upgraded.
- If the ERROR indicator (orange) is illuminated during the firmware program upgrading procedure, repeat the procedure from the beginning.

2). Upgrading on Windows 95/98

(1) Confirm the FR3950α SC Controller is securely connected to the personal computer which is to be used for program upgrading procedure.

(2) Turn on the FR3950α SC Controller, pressing down the STOP button and the FUNCTION button on the SC panel together, and keep them pressed down until all 3 indicators on the SC panel are illuminated and then the ERROR indicator (orange) goes off among them. Release the buttons.

(3) Turn on the personal computer and start Windows 95/98.

(4) Insert the floppy disk which contains an upgraded firmware program into the floppy disk drive on the personal computer.

NOTE : We must have the utility software which downloads file data in the floppy disk.

(5) Click on [Start] button in the Desk Top window and then on [Run...] in the menu. The [Run] dialog box then appears.

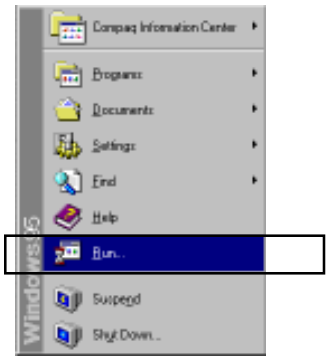
(6) Enter "A:\Writemeu.exe" into the box. (If the "C" drive is assigned as floppy disk drive, enter "C:\Writemeu.exe" into this box.)

The above-mentioned file name can be selected from the file name reference list which can be opened by clicking on the [Browse...] button in the [Run] dialog box.

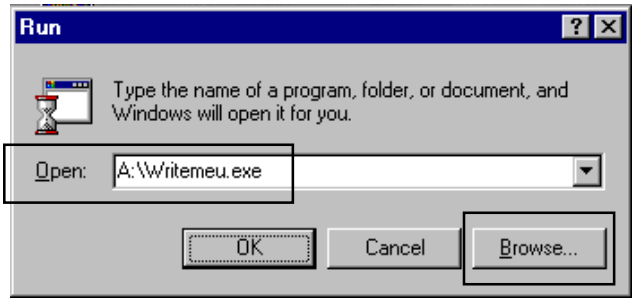
(7) Confirm the entered file name is correct and click on the [OK] button.

(8) Click on the [OK] button in the [Program Downloader] dialog box.

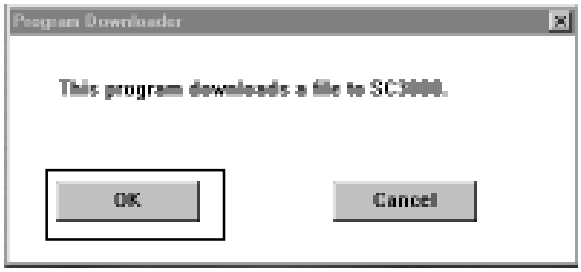
The [Open] dialog box then appears.



(run)



(rundial)

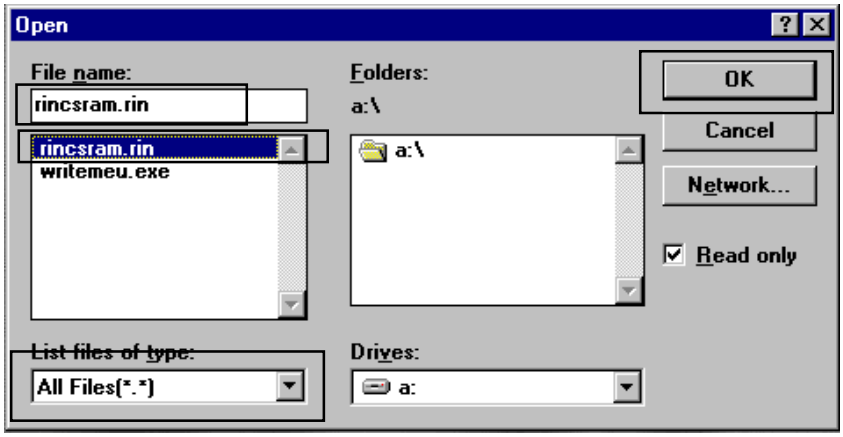


(Programdown)

(9) Select "rincsram.rin" from the file name list in this dialog box. In "rincsram.rin", the upgraded firmware program is contained.
(If this file name isn't displayed in the file name list, select "All Files(*.*)" from the [List files of type] box in this dialog box.)

(10) Confirm "riscram.rin" is displayed in the [File name] box and click on the [OK] button in this dialog box.

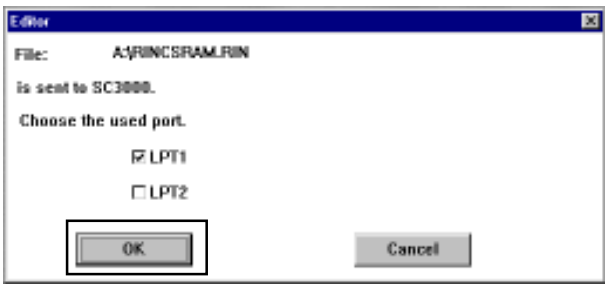
The [Editor] dialog box then appears.



(open)

(11) Select the port to which the **NOTE :** We must have the utility software which downloads file data in the floppy disk. is connected, normally "LPT1", and click on the [OK] button in this dialog box.

The message box "Downloading" appears while the READY/DATA indicator (green) on the SC panel is flashing.



(FRSC95 fup05)

(FRSC95 fup06)

(12) When it is confirmed the firmware program has been downloaded successfully into the FR3950α SC Controller, the READY/DATA indiactor stop flashing and the PAGE STANDBY indicator starts flashing, while the [Mini Editor] dialog box appears, informing the program has been successfully downloaded.

(13) Click on the [OK] button in this dialog box. Turn off the FR3950α SC Controller and then remove the floppy disk from the floppy disk drive on the personal computer.

[NOTE]

- It is recommended that the version number of the installed firmware program be checked when it is upgraded.
- If the ERROR indicator (orange) is illuminated during the firmware program upgrading procedure, repeat the procedure from the beginning.

3). Upgrading on MS-DOS

(1) Confirm the FR3950α SC Controller is securely connected to the personal computer which is to be used for program upgrading procedure.

(2) Turn on the FR3950α SC Controller, pressing down the STOP button and the FUNCTION button on the front panel together, and keep them pressed down until all 3 indicators on the front panel are illuminated and then the ERROR indicator (orange) goes off among them.

Release the buttons.

(3) Turn on the personal computer.

(4) Insert the floppy disk which contains an upgraded firmware program into the floppy disk drive on the personal computer.

NOTE : The utility software which downloads file data is also contained in this floppy disk.

(5) Change the current directory to the root directory of the floppy disk drive.

Ex. If the root directory of the floppy disk drive is the "A" drive;

1. Enter "A:" and Press the Enter key.
2. Enter "CD \" and Press the Enter key.

(6) Enter "SC3KU" and press the Enter key.

The following message is then displayed.

```
<<<<<< SC3000 / Program Transmission >>>>>> [ Ver. 1.00 ]
File Name = RINCSRAM. RIN
        READY? ( [ 0 ] : START, 1 : JOB END ) =
```

In "RINCSRAM. RIN", the upgraded firmware program is contained.

(7) Enter "0" and press the Enter key.

The upgraded firmware program then starts to be downloaded, while the displayed value of "Byte Count" keeps increasing and the READY/DATA indicator on the SC panel is flashing.

To interrupt this downloading operation, enter "1" and press Enter key.

(8) When it is confirmed the firmware program has been downloaded successfully into the FR3950α SC Controller, the READY/DATA indiactor stops flashing and the PAGE STANDBY indicator starts flashing, while the message "Completed ..... hit RETURN/ ENTER key!" appears at the bottom of the screen.
Press the Enter key. The following message then appears again.

```
<<<<<< SC3000 / Program Transmission >>>>>> [ Ver. 1.00 ]
File Name = RINCSRAM. RIN
        READY? ( [ 0 ] : START, 1 : JOB END ) =
```

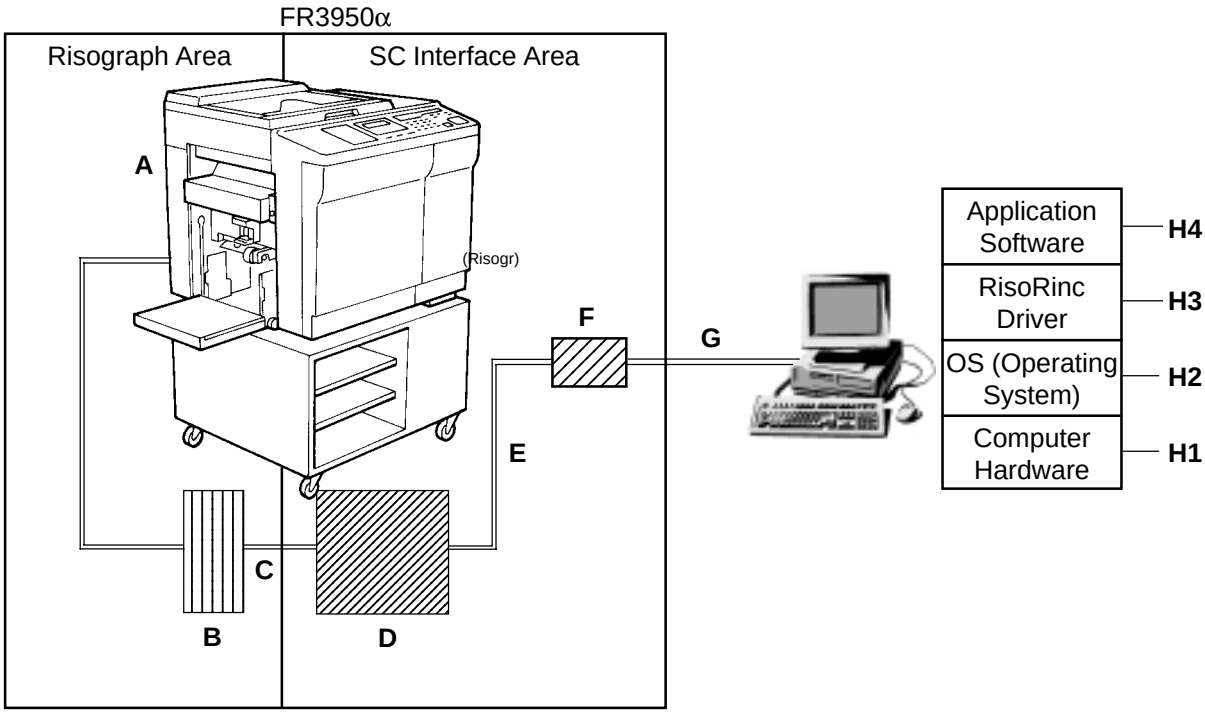
(9) Enter "1" and press the Enter key.
Turn off the FR3950α SC Controller and then remove the floppy disk from the floppy disk drive on the personal computer.

[NOTE]

- It is recommended that the version number of the installed firmware program be checked when it is upgraded.
- If the ERROR indicator (orange) is illuminated during the firmware program upgrading procedure, repeat the procedure from the beginning.

5. TROUBLE-SHOOTING TIPS

5-1. Isolating Fault Area



A Risograph Area

B Option PCB

C Inner Wire-Harness between Option PCB and SC Main PCB

D SC Interface Area (SC Main PCB, SC Power Supply PCB, etc.)

E Inner Wire-Harness between SC Main PCB and I/F-Port PCB

F I/F-Port PCB

G Printer Cable

H Computer System

- **H1** Computer hardware - printer port
- **H2** OS (Operating System)
- **H3** RisoRinc Printer Driver
- **H4** Application Software

Try to make tests which will eliminate areas as possible causes of any fault.
The following is a guide to checking the system by area.

1) **Area A (Risograph Area):**

- No power, No (Wrong) Print -

The Risograph may be tested on its own to determine if the Risograph is the cause of any print error.

Risograph Test Modes

The Risograph has several test modes for checking the stand-alone function of the print engine. Refer to the Risograph section of the Technical Manual.
If Area A is found to cause the fault repair the Risograph by referring to the Risograph section of the Technical Manual.

2) **Area B (Option PCB):**

- No (Wrong) Print -
Check following points.
> Connection of the connectors (CN1, CN2)
> Make sure that SW1 set to OFF (400dpi) position-Set as factory default

3) **Area C (Wire Harness between Option PCB and SC Main PCB):**

- No (Wrong) Print -
Check following points.
> Breakage of the Wire-Harness
> Make sure that correct Wire-Harness use (Must use Wire-Harness for Option PCB AIII)

4) **Area D (SC Interface Area):**

- No power, No display on SC Panel -
Check following points.
> SC Main Power SW2
> Connection of the connectors
- SC Main PCB (CN3, CN6)
- Power Supply PCB; SC3K (CN1, CN2)
- SC Panel PCB (CN2, CN3)
- SC LCD Panel
> Breakage of the Wire-Harness
- SC Power SW - SC Power Supply PCB
- SC Power Supply PCB - SC Main PCB
- SC Main PCB - SC Panel PCB
- SC Panel PCB - SC LCD Panel
> Fuse (F11) on the SC Power Supply PCB
> SC Power Supply PCB
> SC Panel PCB
> SC Main PCB

4) **Area D (SC Interface Area):** - continue from previous page -

- No CPU fan running -
Check following points.
> Connection of the connector
- SC Main PCB (CN5)
> Breakage of the Wire-Harness
- SC Main PCB - CPU fan
> CPU fan
> SC Main PCB

- No (Wrong) Print -
Check following points.
> Connection of the connectors
- SC Main PCB (CN3, CN4)
> SC Main PCB

5) **Area E (Wire Harness between SC Main PCB and I/F-Port PCB):**

- No (Wrong) Print -
Check following points.
> Breakage of the Wire-Harness

6) **Area F (I/F-Port PCB):**

- No (Wrong) Print -
Check following points.
> Connection of the connector
- I/F Port PCB (CN3)
> IF-Port PCB

- No (Wrong) Print through Parallel Port -
Check following points.
> Connection of the connector
- I/F Port PCB (CN1)
> IF-Port PCB

- No (Wrong) Print through Mac Serial Port -
Check following points.
> Connection of the connector
- I/F Port PCB (CN2)
> IF-Port PCB

Please make Self Test Print without connect the computer before goes to further area.
(Please refer 5-2. to make Self Test Print)
If you got correct Self Test Print without connect the computer, please move to Area G.

7) **Area G (Printer Cable):**

- No (Wrong) Print through Parallel Port -
Check following points.
> Breakage of the parallel cable
> Make sure correct parallel cable uses (Less than 2m long)
> Connection of the connectors (Both sides)

- No (Wrong) Print through Mac Serial Port -
Check following points.
> Breakage of the Mac serial cable
> Breakage of the LocalTalk cable
> Make sure correct LocalTalk cable uses (Use the Mac Genuine cable)
> Connection of the connectors (Both sides)

8) **Area H1 (Computer Hardware):**

- No (Wrong) Print -
Check following points.
> Print from other printer if available to ensure the computer itself is good working condition
> Normal Printer Port must be selected (Not ECP, EPP nor other Enhanced port) - IBM PC or compatible
> Minimum requirement hardware installed

9) **Area H2 (OS):**

- No (Wrong) Print -
Check following points.

IBM PC or Compatible
> Make sure that correct kind or version of Operation System installed in PC
> Normal Printer Port must be selected (Not ECP, EPP nor other Enhanced port)

Apple Macintosh
> Make sure that correct version of Operation System installed in Macintosh
> QuickDraw (Not QuickDraw GX) must be installed in Macintosh

10) **Area H3 (RisoRinc Printer Driver):**

- No (Wrong) Print -
Check following points.

IBM PC or Compatible
> Make sure that the Printer Driver installed in the PC which compatible with the Operation System

11) **Area H4 (Application Software):**

- No (Wrong) Print -

Check following points.

> Correct Printer selected for the print

> Make sure "Collate Copies" column in the Print dialog box is **unmarked**.
PageMaker, MS-Word, etc.

> Correct resolution (400 x 400dpi) must be selected in the SC3000 series Printer Setting Dialog box.

5-2. Test Print

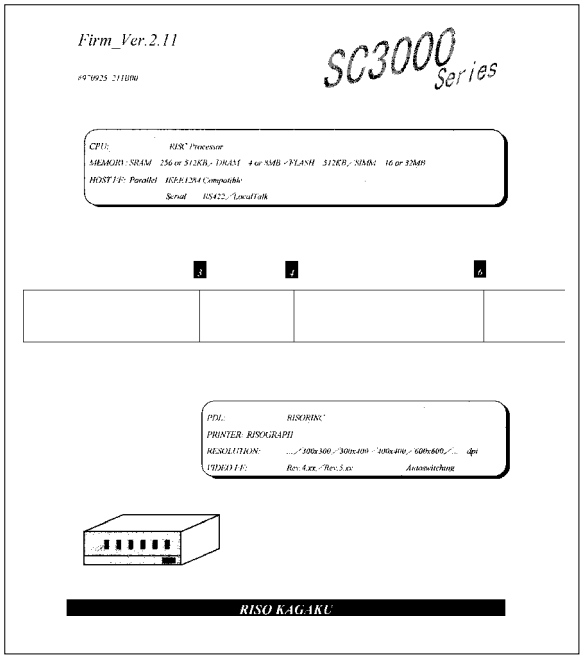
The SC Controller in the FR3950α forwards the internally equipped image data to FR3950α directly, and does the Master-making and Printing.
When an error occurs, we can judge from this Test Print whether or not the FR3950α Risograph area is in a normal condition.
If the test prints come out correctly, the FR3950α Risograph area is in a good condition.
The Test Print image is in A4 size.

Procedures for the Test Print

1) Pressing the "START" key of the SC Panel, turn ON the power of the FR3950α , and keep the "START" key pressed until the "ERROR" and "PAGE STANDBY" LEDs goes off.

2) The "READY" LED lights up while the Test Print image data within the SC Main PCB is being processed.

3) "TEST-DATA PROCESSING" will appears on LCD when the Test Print data processing is completed. The Risograph area starts the Master-making, followed by a proof print and the first print.



Important Notice:

>A model name FR3950α not shown on the Test Print.
It shows SC3000 series instead.
>The Test Print image may change without notice.

5-3. Error Indicator on SC Panel

5-3-1. The READY/DATA indicator doesn't flash even after the print job finishes in the application software.

CAUSE
The SC Controller cannot receive print data from a personal computer.

1) The printer cable is not securely connected between the SC Controller and the personal computer.
2) The personal computer's system is not set up for the SC Controller, e.g. the [RisoRinc SC3500] printer driver is not selected for the print job in question.
3) The page memory of the SC Controller is filled with the preceding print data and has no space for the print data in question.

Wait until the print data filling the page memory is output from the SC Controller to the Risograph.

5-3-2. The READY/DATA indicator keeps on flashing slowly without any printer's operation even after the print job finishes in the application software.

CAUSE
The SC Controller cannot output the print data received from a personal computer to the Risograph while the latter is ready to receive it from the former.

1) The printer cable or LocalTalk cable was removed just after a print job started in the application software. [Printing] is displayed in the Print Manager or "Print queue" dialog box in this case.
   Connect the printer cable or LocalTalk cable and cancel the current print job in the Print Manager or "Print queue" dialog box. Then turn off the SC Controller.
2) The print job was suspended by the personal computer's system. [Pause] or [Hold] is displayed as printer status in the Print Manager or "Print queue" dialog box.
   Select the file name in question and click on the [Restart] button in the Print Manager or the [Resume] button in the "Print queue" dialog box to resume the suspended print job.
3) The print job may have been canceled on the way in the application software on the personal computer.
   Turn off the SC Controller.
4) The printer settings (paper size, print orientation, printer driver, etc.) in the application software don't match those in the SC printer driver, i.e. the [RISO SC3000 Setup] dialog box. < only on the Windows 3.1 platform >
   Change the printer settings in the application software to make them identical with those in the printer driver or vice versa, and repeat the print job in question from the application software.

5-3-3. A print job has been suspended and the PAGE STANDBY indicator is flashing.

CAUSE

A "Pause" command was recognized in the SC Controller during the print job and the SC Controller is requesting an instruction on what to do next.
Press one of the following buttons to resume operation according to the suspended condition
: START button (or I/F key on the Risograph), STOP button or FUNCTION button.

5-3-4. Page image is not centered or is clipped at an edge.

CAUSE

The print condition settings are not correct.

1) The paper size setting in the application software or the [Page Setup] dialog box is not identical with the actual paper size on the Risograph.
2) The paper feed direction setting in the [Options] or [Page Setup] dialog box doesn't match the actual one on the Risograph.

6. DISASSEMBLY AND RE-ASSEMBLY

6-1. SC Main PCB

6-1-1. Turn OFF the power
6-1-2. Unplug the AC Power Cord
6-1-3. Open the Front Cover
6-1-4. Remove 2 Pan Head Screw (6x8) from the Front Cover Lower Hinge (Fig.1)
6-1-5. Remove Front Cover Lower Hinge
6-1-6. Remove Front Cover

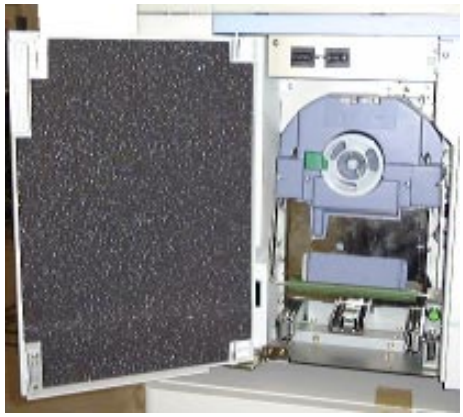


Fig.1

6-1-7. Remove 2 Binding Head Screw (8x8) from the Front Left Cover (Fig.2)

Fig.2

6-1-8. Remove 2 Binding Head Screw (8x8) from the Front Left Cover (Fig.3)

6-1-9. Remove Front Left Cover

Fig.3

6-1-10. Remove 5 Binding Head Screw (6x5) from both sides of the Front Left Cover (Fig.4)
6-1-11. Disconnect CPU cooler connector from the SC Mian PCB.
6-1-12. Remove SC Unit Cover

Fig.4

6-1-13. Disconnect connectors (CN1, CN3, CN4,CN6) from the SC Main PCB. (Fig.5)
6-1-14. Remove 7 Binding Head Screw (6x5) from the SC Main PCB. (Fig.5)
6-1-15. Remove the SC Main PCB

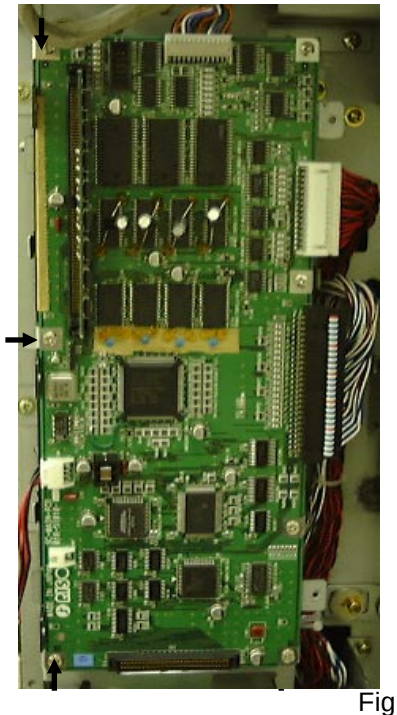


Fig.5

6-2. SC Power Supply PCB

6-2-1. Take same procedure has been showed on 6-1-1 through 6-1-9
6-2-2. Disconnect connectors (CN1, CN2) from the SC Power Supply PCB. (Fig.6)
6-2-3. Remove 2 Binding Head Screw (6x5) from the SC Power Supply PCB. (Fig.6)
6-2-4. Remove the SC Power Supply PCB

Fig.6

6-3. I/F-Port PCB

6-3-1. Turn OFF the power
6-3-2. Unplug the AC Power Cord
6-3-3. Remove 5 Binding Head Screw (8x8) from the Back Cover (Fig.7)

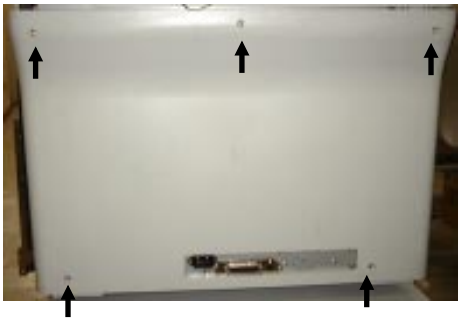


Fig.7

6-3-4. Remove 2 Pan Head Screw (6x8) from the Mount (Fig.8)

6-3-5. Remove the Mount
6-3-6. Remove 2 Binding Head Screw (6x5) from the Mount (Fig.8)
6-3-7. Disconnct the connector CN3 (Fig.9)
6-3-8. Remove the I/F-Port PCB

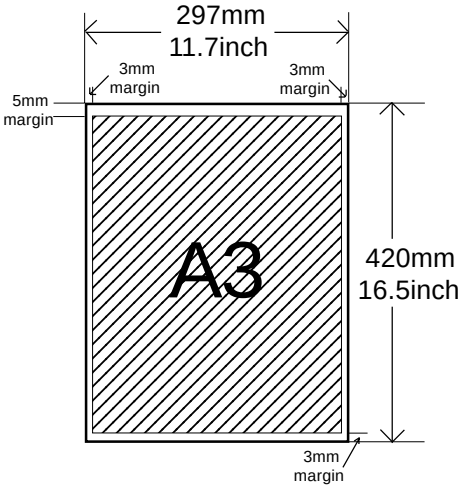
Fig.8

Fig.9

7. APPENDIX (SC SECTION)

7-1. Theory of Data Processing

The SC Contoroller is equiped standard with a 8MB RAM as a Page data memory, which can be expanded to maximum 40MB.
8MB RAM will be able to process two A3 size page (400dpi).



A full A3 size 400dpi image equals to 29,808,000 dots(bit).

Which is equal to
(11.5inch X 400dpi) X (16.2inch X 400dpi) = 29,808,000
[No count for the area of margin]

Since
8 bit = 1 byte,

29,808,000 bit / 8 / 1,024= 3,638kbyte / 1,024 = 3.55MB

If A4 (400dpi) is selected as the paper size, the A4 (400dpi) size area is half that of the A3 (400dpi) size, so four A4 (400dpi) pages can be processed in one operation.
Which means, "Four allocated pages".
If A5 (400dpi) is selected as the paper size, the allocate pages are nine.

The page memory data is processed within SC Controller when the data is first sent to SC Controller from the Print Manager of the Computer.
(The paper size information is the first data on the data transmitted, the allocated page quantity is the first item to be processed.)
The Master-making on the Risograph starts when the data processing for one page is completed.
At the same time, the data processing of the second page will start if the allocated page quantity is two or more.
If the allocated page quantity is one, the data processing of the second page will not start until the Master-making is completed and the printing starts and the page memory is cleared.

Therefore, the smaller the paper size, or larger the memory(RAM) size, the faster the data transfer is from the computer to SC Controller, and will be an advantage if the page data file is in several pages.

Since SC Controller does not start processing the next file until the Master-making and printing of the present file is completed, even though a print command is given for two or more files and the first file is not using the full allocated page memory.

7-2. CD-ROM File Contents

7-2-1. Contents of RisoRinc CD-ROM Ver.1.0 (Macintosh)

FRENCH
...
GERMAN
...
ITALIAN
...
JAPANESE
...
SPANISH
...
UK_ENG
-SC3500 paper Editor(U)
-SC3500 RisoRinc QD(A.T)U
-SC3500 RisoRinc QD(U)
US_ENG
...

7-2-2. Contents of RisoRinc CD-ROM Ver.1.0 (Windows)

Chinese
...
French
...
German
...
Italian
...
Japanese
...
Portugal
...
Spanish
...
Uk_eng
-Win31
Oemsetup.inf
Riso3r.hlp
-Win95_98
Riso3r.hlp
Risodrv.inf
-Winnt4
Riso3r.dl_
Riso3r.inf
Riso3rui.dl_
Riso3rui.hl_
Sc3rmon.dl_
Us_eng
...

7-3. Description of SC Panel LED

These three LEDs indicates the current status of FR3950α.

ERROR	This LED indicates error on the Risograph.
READY/DATA	This LED indicates the data receiving condition from the computer.
PAGE STANDBY	This LED indicates the completion of 1 page data processing. Also this LED indicates that the unit is in stand by mode waiting for the next command.

LED / STATUS	ERROR (Orange)	READY/DATA (Green)	PAGE STANDBY (Yellow)
> Immediately after the Power turned ON	ON	ON	ON
> Ready for operation (Waiting for the data)	OFF	ON	OFF
> Data processing in progress (Receiving the data)	OFF	Flashing (Fast)	OFF
> Data processing in progress (No data receiving)	OFF	Flashing (Slow)	OFF
> Page data completed	—	—	ON
> No error on Risograph	OFF	—	—
> An error on Risograph (Jam error, Service call, etc.)	ON	—	—
> No power on the Risograph > Try to make interface ON during Risograph busy condition > Communication error between SC and Risograph areas	Flashing	—	—
> Waiting for next operation command	OFF	—	Flashing

— : Depends on each conditions

7-4. Description of SC Power Select Switch and SC Panel Button

7-4-1. SC Power Select Switch

A function of SC Power Select Switch is changing status of the SC Power.

SC Power Select Switch Position	Status of the Power
SW1	Rely on Main Power SW Main Power ON - SC Power ON Main Power OFF - SC Power OFF
⏽	SC Power always ON Main Power OFF but SC Power stays ON

7-4-2. SC Panel Button (Normal Mode)

Function of five SC Panel Buttons are follows.

CONDITION / BUTTON	Menu Mode	Ready Mode	Page Selection Mode
STOP Button	Abort the Menu Mode	Interrupt AUTO mode (Make-master or Print) Interrupt Printing job Skip Print on Manual Print Mode Interrupt Re-starting after Error Recovery	
START Button	Save set items or modified items data into SC Controller (push twice)	Start prints on Manual Print Mode Re-start after Error Recovery	Proceed Make-master and Prints on selected page
FUNCTION Button	Goes into Modification of set items	Goes into the Menu Mode Re-Make master on Manual Print Mode	
FUNCTION +STOP Buttons			Deletes all processed pages in the page memory
FUNCTION +START Buttons			Make-master and Print all processed pages in the page memory

CHAPTER 19: OTHER OPERATION & FUNCTION

Contents

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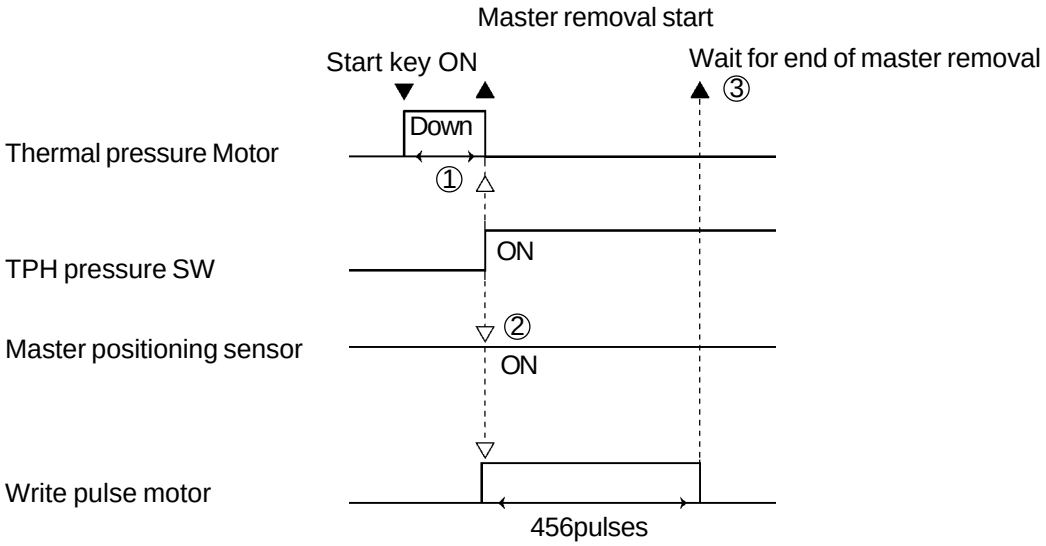
2. Automatic Idle 19-3
3. Multi Up Printing (2, 4, 8 and 16up) 19-4
4. TPH Test Pattern Print Out 19-5
5. Auto Power-Off 19-6
6. Preventive Maintenance Indication 19-7
7. Job Separator Activate Signal 19-8

1. Confidential Mode

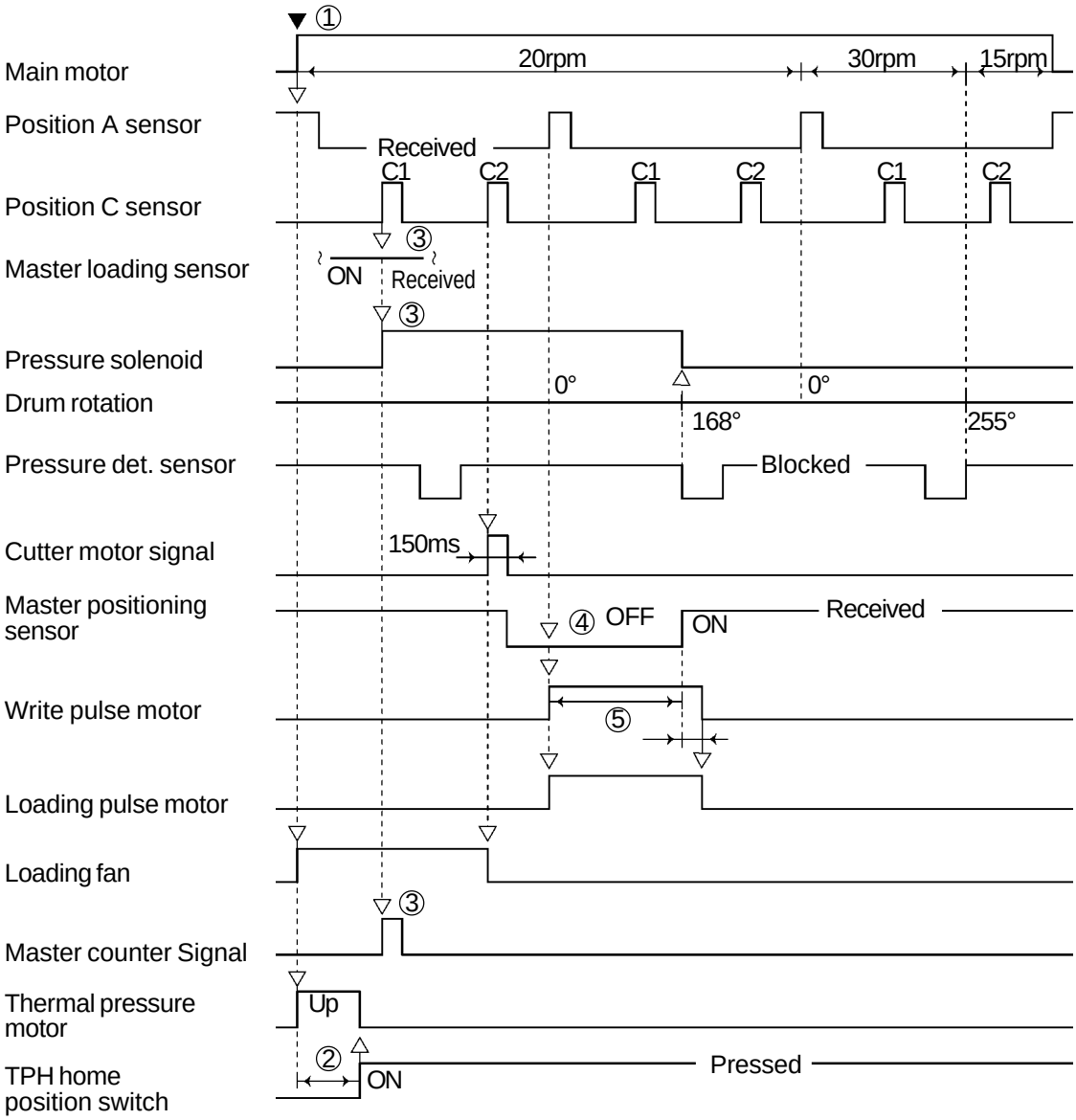
The “CONFIDENTIAL” function is designed to discard the master after printing and wind the blank master around the drum to prevent duplication of the confidential document.
It saves some blank masters in the stocker simultaneously with master removal, and then, loads it. Although the Pressure roller moves up when the master is wound around the drum, the paper is not fed for the first print.

Confidential Mode Timing Chart (1)



① If the TPH pressure switch has not been pressed within 4 seconds after the Thermal pressure motor is activated, the machine assumes a Thermal pressure motor lock has occurred and displays the error code **[T19]**.
② If the Master positioning sensor has not detected master material , the Write pulse motor start to rotate after the Master positioning sensor detect master.
③ Once the Write pulse motor is turned off, wait for end of master removal operation and load the master on the drum.

Confidential Mode Timing Chart (2)



① The master removal and the clamp plate operation is completed. For removal of the master and closing of the Clamp plate, see their respective sections.

② If the TPH home position switch is not pressed 4 seconds after the Thermal pressure motor is turned on in the upward direction, **[T19]** will be displayed, judging that the Thermal pressure motor is locked.

③ If the Master loading sensor is sensing the light(with the master), the Pressure solenoid will be turned on and turn on the master count signal. If it is not sensing the light(without the master), **"CLAMP ERROR REMOVE MASTER ROLL THEN RE-INSTALL."** is displayed.

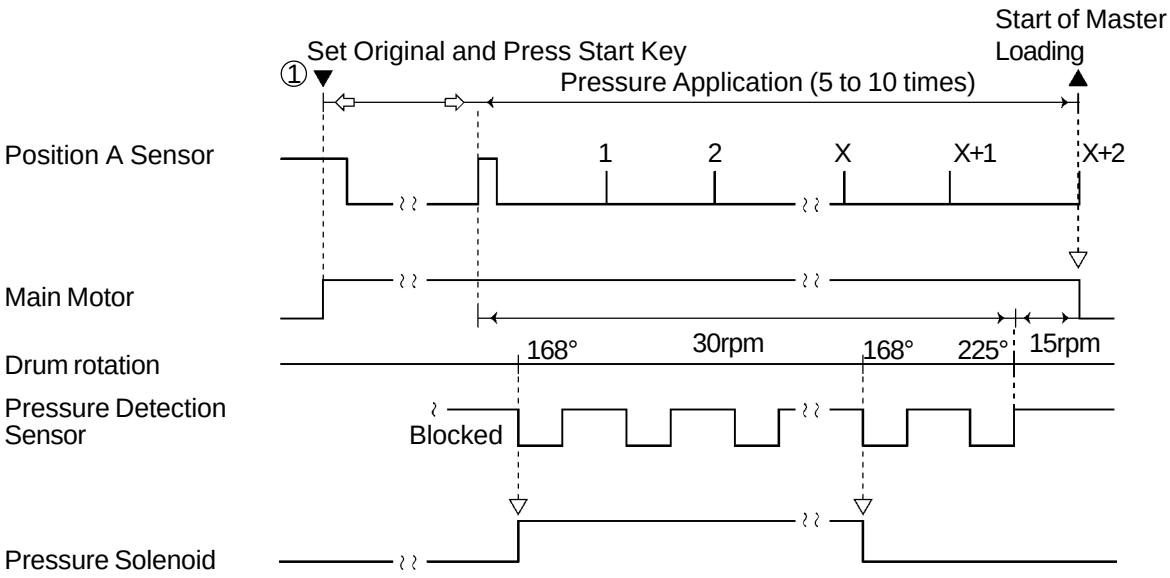
④ If the Master positioning sensor is not sensing the light(without the master), the Write pulse motor and Load pulse motor will be turned on. If it is sensing the light(with the master), the machine will cope with a master cutting error, juding it a master cutting error.

⑤ If the Master positioning sensor has not detected the leading edge of master material within 1,574 pulses after the Write pulse motor and Loading pulse motor start, the machine assumes the master mis-feed has occurred and displays the error message **"MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL"**.

2. Automatic Idle

Automatic idle operation means to improve ink application to the drum surface by activating the confidential function and applying a pressure to the Drum prior to loading the new master after leaving RISOGRAPH unoperated for a long time.
When the “AUTO IDLE” LED is illuminated on the panel, set the original and press the Start key. Automatic idle operation will be performed.
If the machine is left unoperated for 12 hours(or 6 hours) or more after printing is finished, or the Auto Idle key is pressed, the “AUTO IDLE” LED on the panel will be illuminated.
If you do not want Automatic idle operation, press the Auto Idle key to turn off the LED.
Automatic idle time can be set to “12 hours,” “6 hours,” or “none” by altering the setting of User Mode No. 06(Auto Idling Time).

Automatic Idle Timing Chart



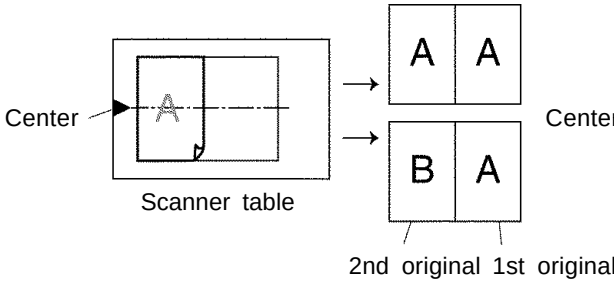
① Idling is performed only while the AUTO IDLE LED is illuminated. If it is unilluminated, master loading operation will start.

- The idling timer starts at the end of master loading, printing, and test printing.
- The number of press movement is changed 5 to 10 times depending on the thermistor data in the Drum and unoperated time.

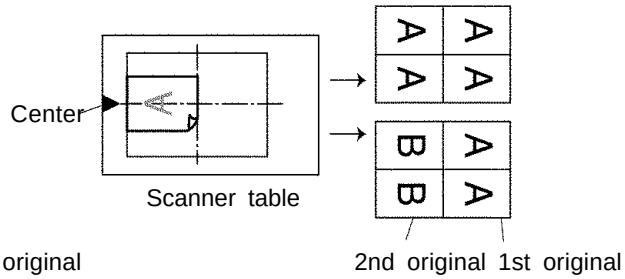
3. Multi Up Printing (2, 4, 8 and 16up)

The Multi Up Printing function is designed to lay out and print one or more originals on a single sheet; it can lay out 2, 4, 8, and 16 frames on a single sheet. There are two kinds of multiframe consecutive printing; single original printing which layout multiple frames from one original and multioriginal printing which lay out multiple frames from multiple originals.

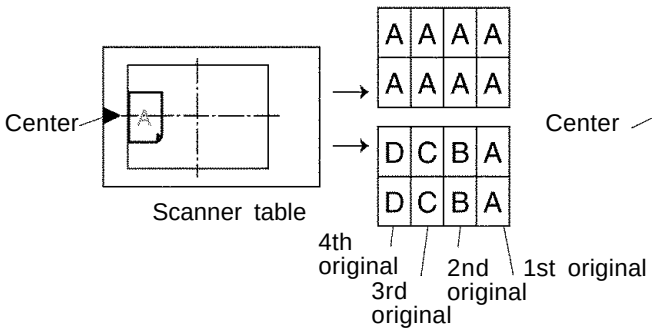
[2 UP]



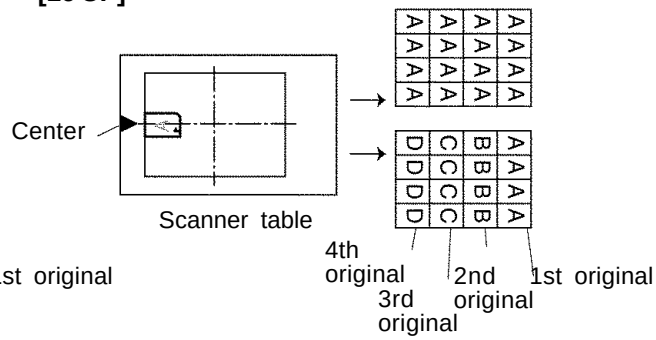
[4 UP]



[8 UP]



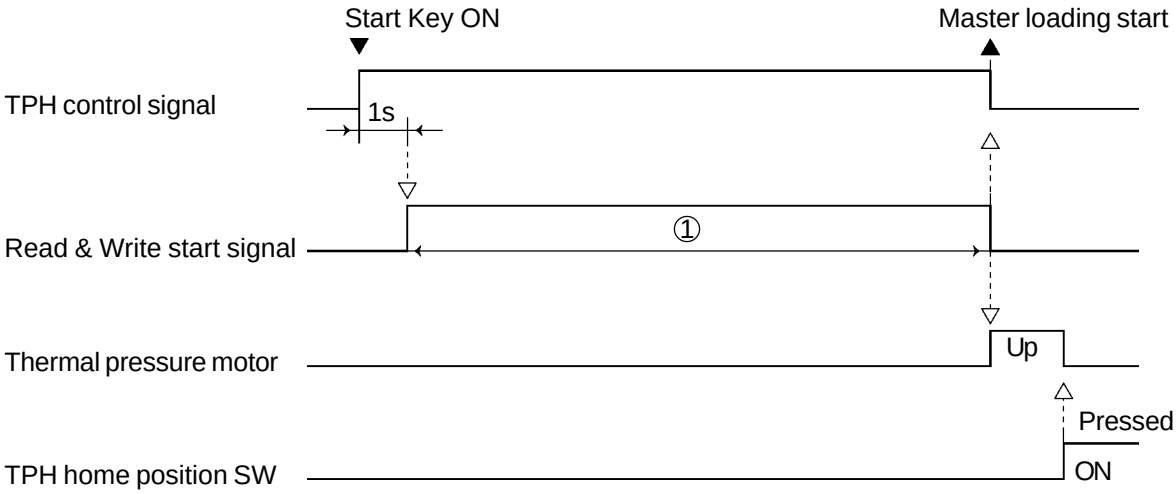
[16 UP]



4. TPH Test Pattern Print Out

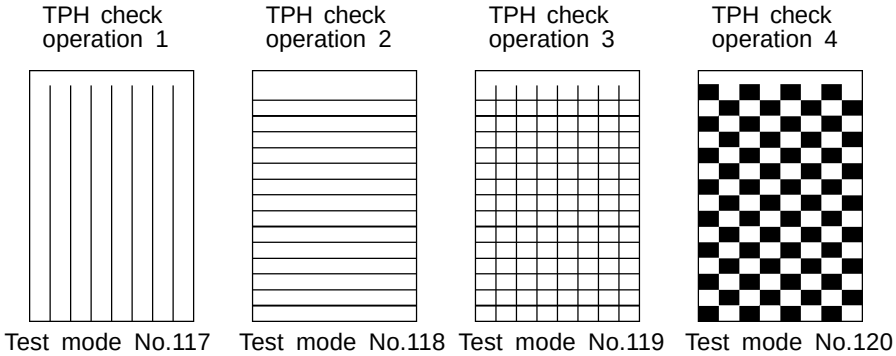
This function outputs the test pattern data in the Image processing PCB directly to the Thermal head. It allows you to check the condition ranging from the Image processing PCB to Thermal head, without interposing the Image scanner.

TPH Test Pattern Print Out



① Write the A3 size worth of data for the A3 drum and B4 size worth of data for the B4 drum, regardless of the printing paper size. The writing width in the main scanning direction depends on the printing paper size.

Test Pattern



5. Auto Power-Off

The Auto power-off function is designed to automatically turn off the printing machine when the printing machine is stopping condition.

- Auto power-off Start Time -

In the User mode, choose and set the stop time after which the Auto power-off function starts.

- OFF(default)
- 5 minutes
- 10 minutes
- 30 minutes

- Printing Machine Stopping Conditions -

When all of the following conditions are met, it can be recognized that the printing machine is stopping.

- No operation is being executed, such as master loading, printing, security function, idling.
- No operation panel key is being operated
- The printing machine has no error.
- The I/F mode is not being turned on.
- The sorter is not working.

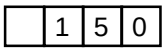
The printing machine measures the time during which all of the above-mentioned conditions are met, and when the measuring time reaches the time set in the User mode, Auto power-off is activated.
The buzzer sounds to notify activation of the auto Auto power-off function just before it is activated.

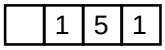
6. Preventive Maintenance Indication

If the number of printed sheets or masters reach their respective set values, “MAINTENANCE CALL SERVICE” is indicated on the LCD panel at power-on after that or just after all reset. Maintenance call indication can be turned off by pressing the All Reset key. Unless a count value is cleared in the Test mode(No.93 or No.94), the maintenance call will be indicated again at next power-off or all reset.

- Setting Method -

1) Start the Test mode, enter “150” (MASTER COUNT) or “151” (COPY COUNT), and press the Start key.

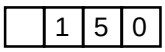




2) In this state, set a target value.

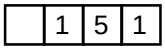
Test mode 150 Target Maintenance master count set

When this is done, a setting increment shall be 100 masters.
For example, pressing “1” sets “100 masters.” That is, the minimum setting limit is 100 masters and maximum setting limit is 999,900 masters.



Test mode 151 Target Maintenance print count set

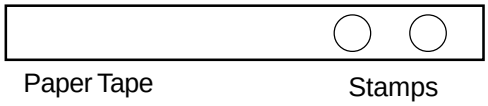
When this is done, a setting increment shall be 1000 sheet.
For example, pressing “1” sets “1000 sheets”



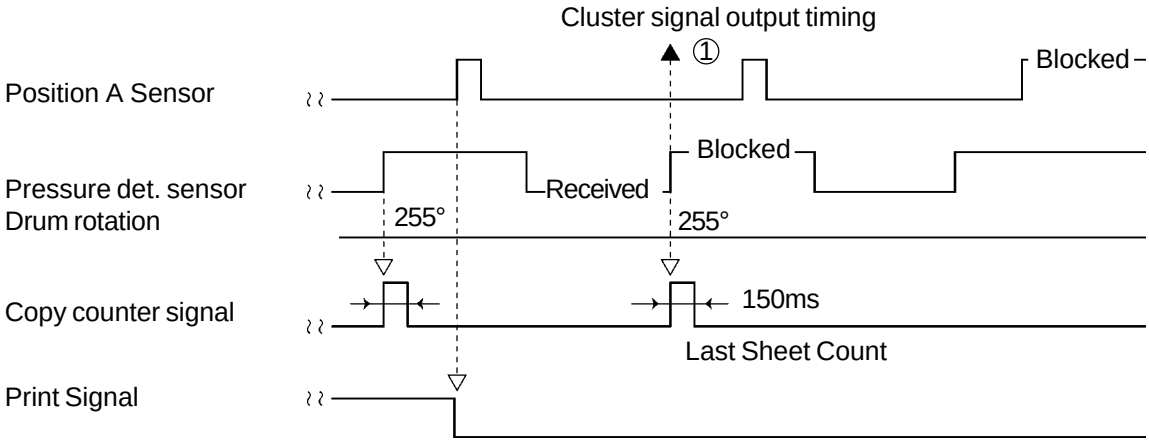
3) Pressing the Start key or Stop key settles the set value and exits the setting screen. If “0” is set, the Preventive maintenance function will not work.

7. Job Separator Activate Signal

A cluster signal is to activate the job separator.
The Job Separator feeds the tape to sort the printed papers on the Paper receiving tray. Connection of the Job Separator needs to be set in the User mode.
Give one or two stamps to the tape to sort it by groups and originals.



-Cluster Signal Output Timing Chart



① The cluster signal is turned on at the output timing of the total counter signal, at which the set number of printed sheets is cleared to “0”. It is not output when normal printing ends.

CHAPTER 20: IMAGE PROCESSING

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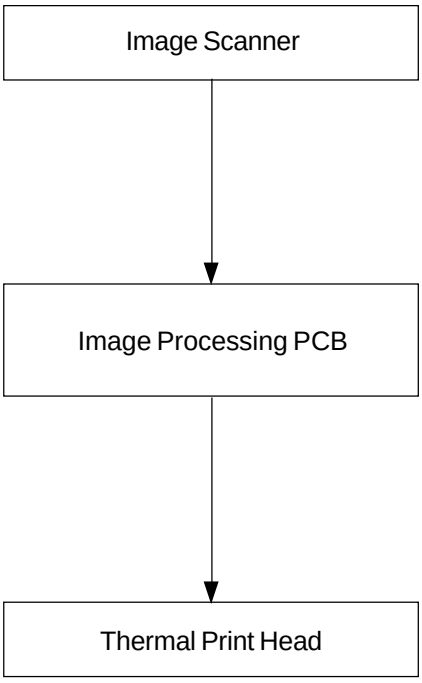
THEORY OF OPERATION

1. Image Processing Flow

The FR Series uses an image scanner to scan original images, which are then made into masters by a thermal print head. An overview of the flow of image processes from scanning to master making is presented below. (The individual image processes are described in detail in later sections of this chapter.)

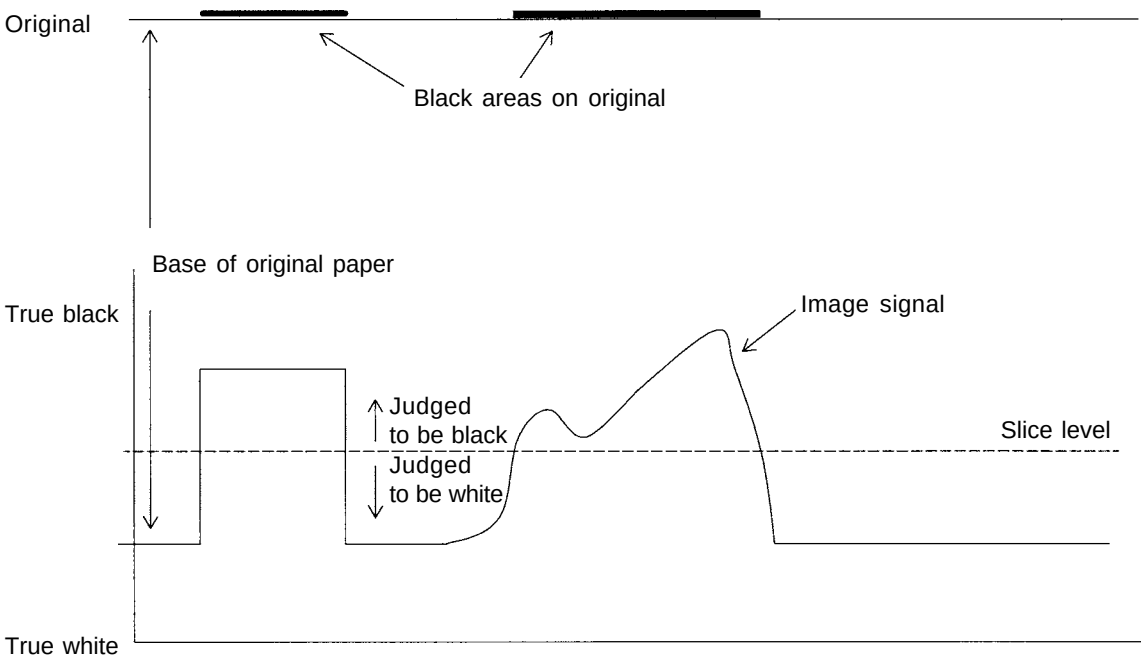


- An original image (analog signal) which had been scanned by the CCD is converted into an image signal (digital signal) with 256 gradations.
- Sensitivity mottling caused by the CCD or LED arrays is compensated for by shading compension, after which the image signal is sent to the Image processing PCB. (page 20T-5.)
- The 256-gradation image signal is corrected into an image signal which is suitable for stencil duplicating by means of gamma compensation. (page 20T-6.)
  (Compensation is not performed in line-copy mode.)
- The image signal is processed differently depending on which of the following modes is used:
  Line-copy mode (page 20T-2)
  Photo mode and dot-photo mode (page 20T-3)
  Line/photo mixing mode (page 20T-4)
  Book mode (page 20T-7)
  The signal is ultimately converted into bivalent data (black or white) and output to the thermal print head.

2. Line Mode Processing

Image Signal and Slice Levels

The image signal from the image scanner provides a value based on the darkness of the original. On the other hand, the data sent to the thermal print head must indicate whether or not to perform master making, i.e., they must be binary (indicating black or white). Thus in line-copy mode, a process is performed whereby the image signal is divided between black and white (binary conversion) very close to the midpoint between true black and true white. The value where this division takes place is called the slice level (threshold value).



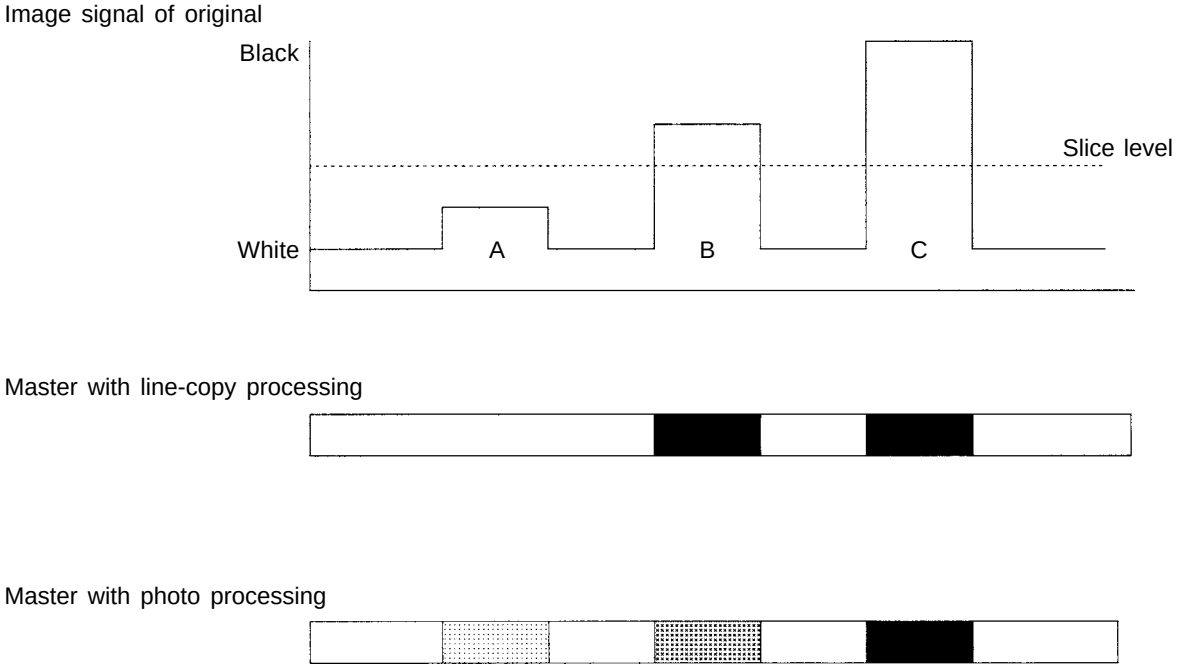
When the slice level is shifted to the true black area, the area judged to be white is increased, resulting in a lower scanning darkness setting. Conversely, when the slice level is shifted to the true white area, the area judged to be black is increased, resulting in a higher scanning darkness setting.

- The line-copy mode slice level can be varied by technicians by moving the slice level value by the Test Mode.
- The slice level can be varied by end users with the original scanning button (manual) on the operation panel.

3. Photo Processing

Line-Copy Processing and Photo Processing

On stencil duplicating process (On a Risograph), heat from the thermal print head forms holes in the master during the master making process. The image which is formed on the master consists of a collection of such holes formed by very small heating elements on the thermal print head.
On line-copy processing, holes are formed in areas where the image signal is at or above a certain darkness level based on the slice level. On photo processing, however, darkness gradations must be expressed. Since it is not possible to alter the size of each individual hole, the distance among the holes are reduced or increased in order to express half tone.



On line-copy processing, areas such as (A) in the diagram above, in which the image signal is below the slice level, will be true white on the master. Areas such as (B) and (C), which are above the slice level, will be true black on the master. Thus even though areas (B) and (C) have different darkness levels on the original, they will both be printed as true black.
On photo processing, half tone is expressed by varying the distance among the holes formed on the master based on the image signal. Thus if area (B) has a blackness level of 60%, then 60% of the corresponding pixels (in the sense of a pixel group) will be black, regardless of whether the individual pixels are black or white (i.e., whether or not holes are formed).
The FR uses two different image processing methods for photo processing. One of these methods, called the error diffusion method, is used for ordinary photos. The another method, called the ordered dither method, is used for mesh dot photos. Both of these methods can be used to express half tone, but they differ in terms of the finished print. The ordered dither method uses a pattern called a dither pattern. The type used with the FR tends to generate mesh dots.
If a pre-shaded photo is used as an original, the ordered dither method will tend to generate a distinctive strip pattern called a moiré.

4. Line/Photo Mixing Mode ("Duo" Mode)

Problems such as the following can occur with originals which contain a mixture of lines and photos.

- If line-copy mode is used for master making, it will not be possible to express the range of gradations in the photo areas on the originals. As a result, the finished printout will have high contrast.
- If photo mode is used for master making, simulated gradation processing will be used even in the line areas of the original. As a result, contrast quality will be worsened.

In order to print clean copies of an original which contains a mixture of lines and photos, the line areas and photo areas on the original should be clearly distinguished from each other, and line-copy processing (simple binary processing) or photo processing (simulated gradation processing) should be used as appropriate to each area. Unfortunately, actual originals contain ambiguous areas which may be lines or photos. Thus an ineffective zoning process could actually create more problems than it solves.

The FR processes mixtures of lines and photos through the method described below.

- Line/Photo Mixed Processing -

Basic Concepts Behind Image Processing

1) Edges are printed as true black.
2) Photo processing gradually proceeds starting at the edge and moving toward a blackish area.
3) Fine lines are sensed for line processing.

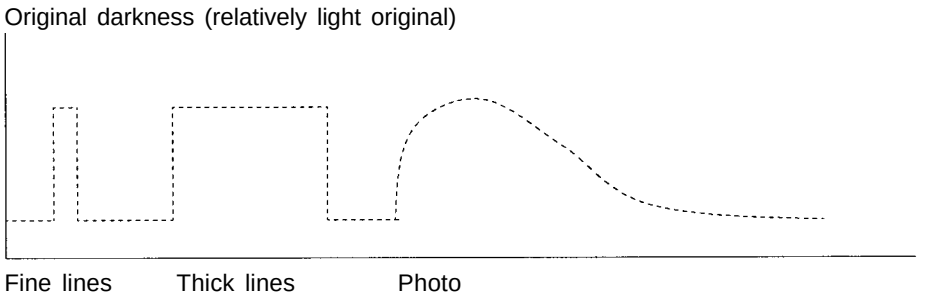
* These processes provide relatively good results.

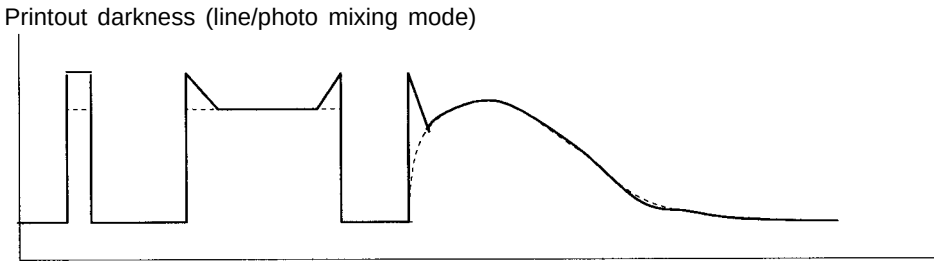
Lines

Even thick lines which are not very dark are printed as true black on the edges and undergo photo processing as the system progresses inward. This results in a decline in darkness. However, because of the sharp contrast between the edges and the base, the lines will appear black on the whole due to an optical illusion. Fine lines are sensed through a fine-line sensing process, making it possible to obtain results very close to those provided by line-copy processing.

Photos

Photos typically do not have edges, so they are almost always handled through photo processing. Even if a photo has edges, the feature described above in 2) ensures that gradations will be maintained and adverse effects on the overall image will be minimized.





5. Shading Compensation

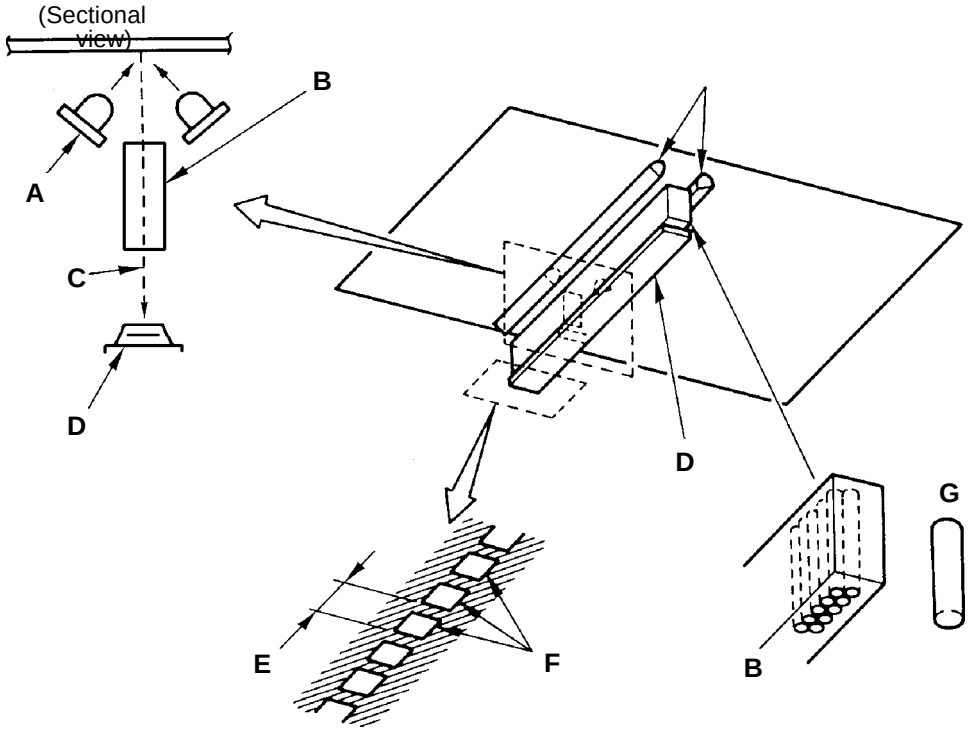
Approximately 4,600 light receiving elements are arranged inside the 400 dpi A3-width image scanner. Because of the sensitivity in the individual light receiving elements, luminosity mottling in the LED arrays which illuminate the original and other factors, the data which are output by the individual light receiving elements will vary, even when the image scanner scans an original of uniform darkness.

Therefore, in order to prevent master making darkness mottling, a type of sensitivity compensation known as shading compensation is performed. Shading compensation involves obtaining true white image data before the original is scanned. These data are used in sensitivity compensation during the process of actually scanning the original.

Image data for shading compensation can be obtained by scanning a true white shading sheet with the image scanner.

* dpi (dots per inch): This represents the number of elements per inch (approximately 25.4 mm).

Image scanner Structure

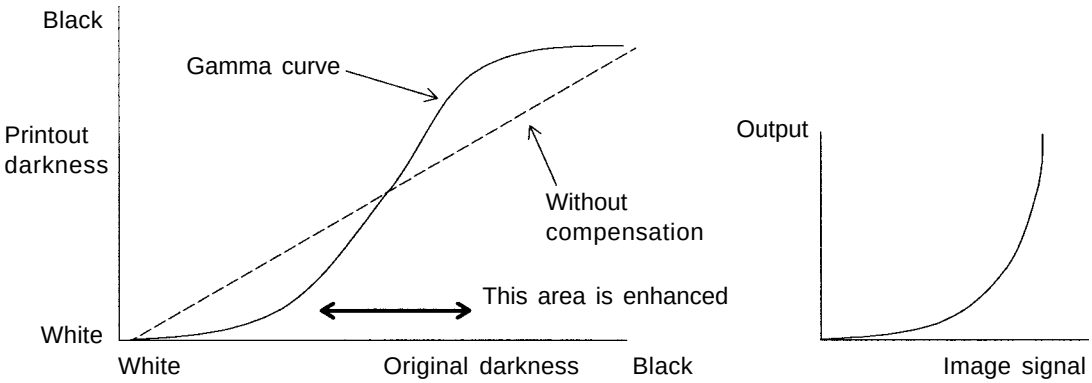


A: LED array
B: Focusing rod lens array
C: Reflected ray
D: Light sensing part
E: 1/400 inch
F: Light sensing elements
G: Optical fiber

6. Gamma Compensation

Gamma Compensation

On printing in photo mode with the FR, if the scanned image signal is used directly for master making or printing, the contrast will be extremely low (especially in half tone). Therefore, in order to closely match the contrast of the printout with that of the original, it is necessary to perform a compensation process whereby the gradations on the white and black ends are dropped so as to enhance the gradations in the area indicated by the arrows in the diagram. This compensation process, called gamma compensation, is used on the image signal during the image processing stage.



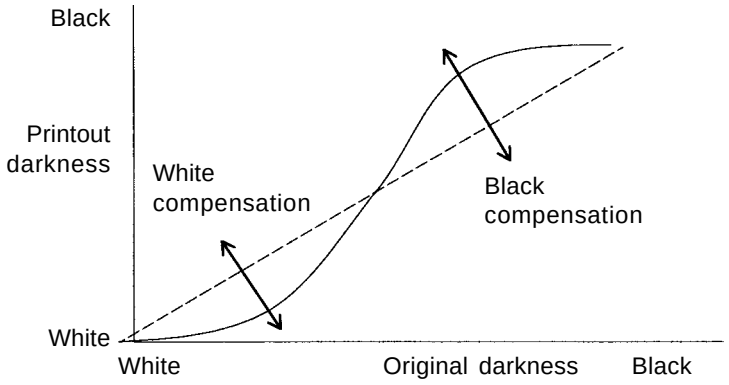
Gamma Curve

The gamma-compensated signal can be expressed as a curve or a straight line as shown in the diagram. This curve is called a gamma curve. The typical gamma curve with the FR is shaped as shown in the diagram. (The upper left diagram shows the correlation between the printout darkness and original darkness. The signal-level gamma compensation curve which is actually applied to the image signal is shaped as shown in the upper right diagram.)

Original Scanning Darkness and Gamma Compensation Settings

You can move the gamma curve in the diagram to the left or right, thereby varying the master making darkness. To do this, press the “Original Scanning Darkness Adjustment” key on the operation panel and move the original scanning darkness setting.

The quality of the photo printout finish depends on the user’s preferences, so the amount of compensation to be applied can be adjusted by the user. To do this, move the Test Mode “Gamma Curve Black Level” value. This changes the gamma curve as shown in the diagram thereby changing just the black end (conversely, you can change just the white end using “Gamma Curve White Level”).

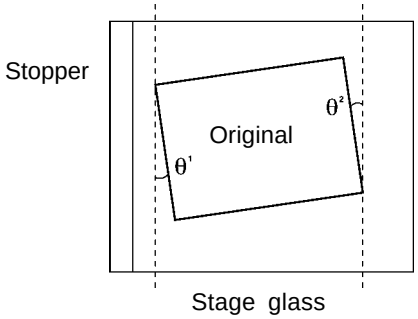


7. Book Processing Function

If the Bound Original mode is selected, prescanning will be performed prior to scanning to check whether or not the original is floating from the scanner table's glass. Viewed from the image scanner, a blackish part is judged outside a range of the original or floating. This function allows to recognize a range of the original and erase outside the range.
It also allows you to check the bound section of the book original for a float and photograph or erase that part. These processes are called trimming.

(1) Taking in the image data at prescanning
Both main scanning and sub-scanning take in the image data pixel by pixel at intervals of about 1 mm and takes two continuous points like white-white as a part of the original.

(2) Setting the frame of the original
After prescanning, the trimming PCB is used to calculate based on the read data. When this is done, the slope of two sides in the main scanning direction of the original is calculated to determine the frame of the original.

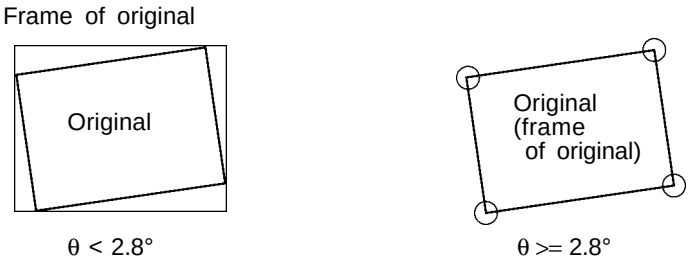


The frame of the original is the range of the original recognized by the machine.

θ_1 and θ_2 are compared, and the frame of the original is formed as follows, based on either θ with smaller slope.

When θ is smaller than 2.8 ° : The frame of the original is formed parallel in both main and sub-scanning directions.

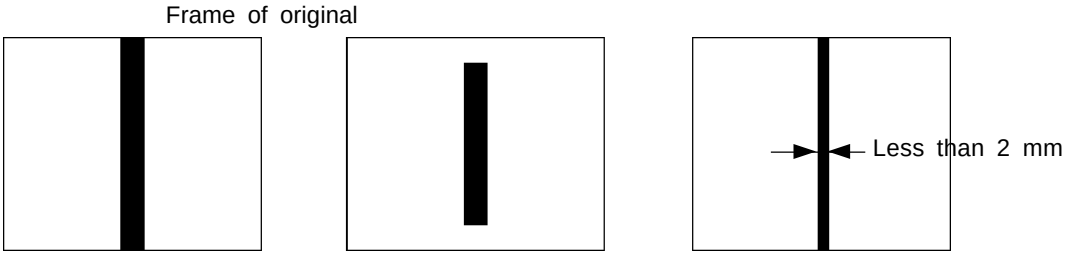
When θ is larger or equal to 2.8 ° : The four corner points of the original are searched for and the frame of the original is formed by connecting those four points.



If the original is shaped like other than a square, this theory may not apply. The outside of the frame of the original is trimmed and not make a image.

(3) Checking the original for a float(bound section)

Based on the image data at prescanning, this function takes a black continuous part extended from outside to inside the frame of the original as a float of the original. Since it takes two or more black-black continuous data points as a float of the original, the float of the original less than 2 mm cannot be dealt with. The float of the original is recognized, even if it is not in the center of the book original.



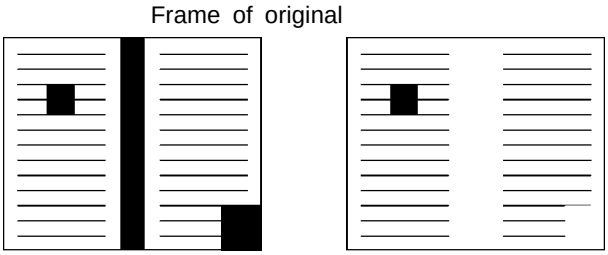
Float of original and recognition
(Trims inside the frame of the original)

Black image inside frame of origin and judgment

No recognition less than 2 mm
(Does not trim inside the frame of the original)

(4) Bound Original ERASE mode

Selecting the ERASE mode erases the floating part of the original.

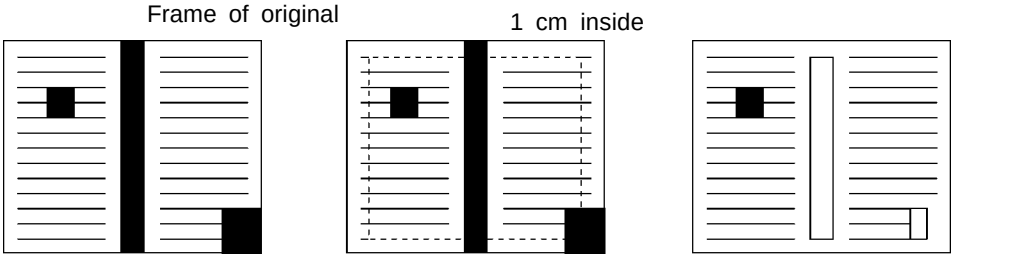


Original

Actual master making area
Erases the floating part of the original

(5) Bound Original PHOTO mode

Selecting the PHOTO mode photographs the floating part of the original. Since the frame of the original may be formed outside the actual original as described above, the area 1 cm inside the frame of the original is not photographed, but erased.



Original

The photographing frame is 1 cm inside the frame of the original.

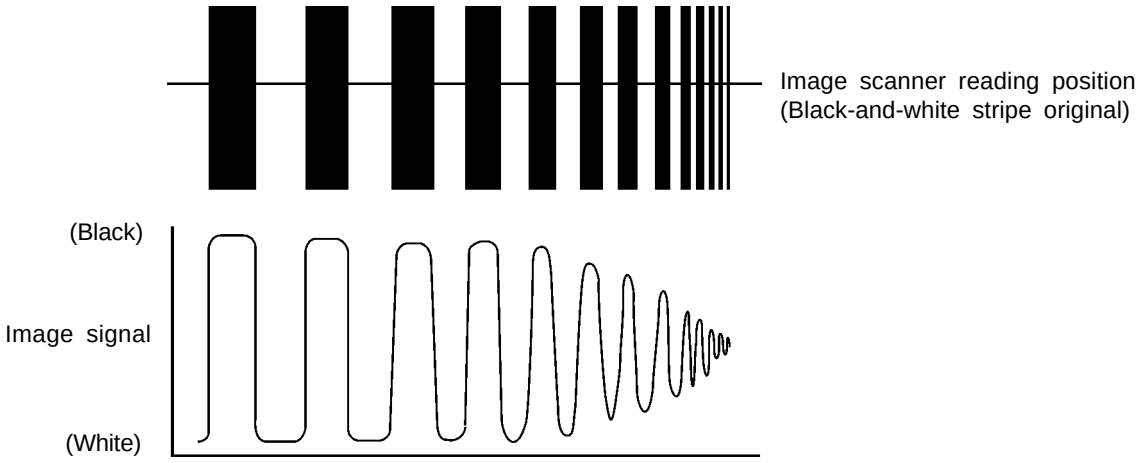
Actual master making area
The floating part of the original outside the photographing frame is erased.

* If there is not a margin of 5 mm or more at the end of the original or there is not a margin of 2 mm or more around it, even the image will be erased. To avoid this, turn off the Bound Original mode.

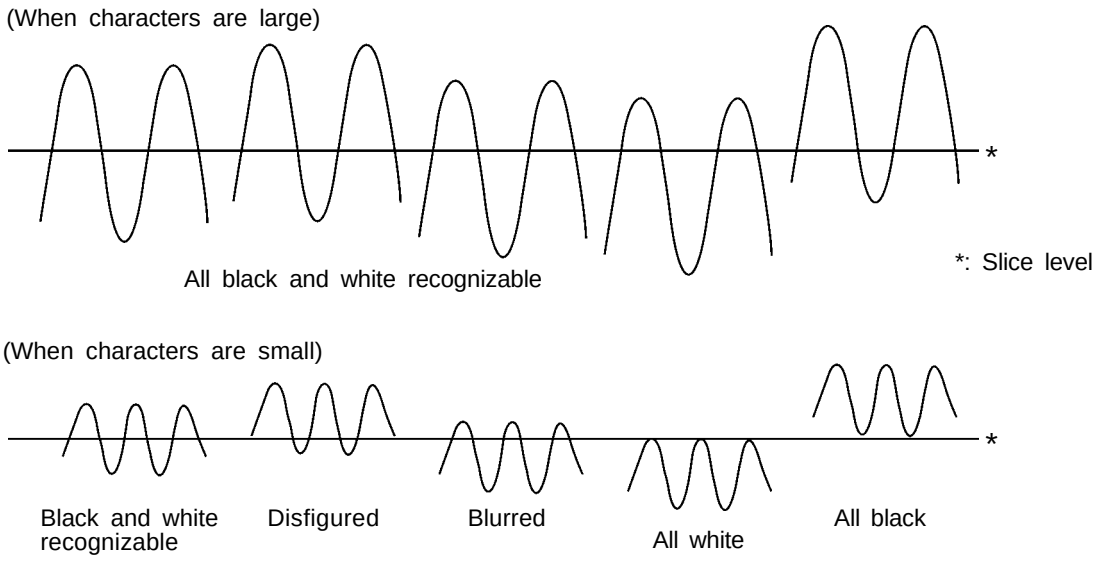
8. Fine Enhancement

(1) Reading of fine characters and image signal

Theoretically, a 400 dpi image scanner should be able to read the original with 400 black and white lines(200 pairs of lines) drawn per inch. Actually, however, even with the original not that much fine, as the characters become smaller or the lines become finer, the amplitude of the image signal is reduced, blurring black and white.



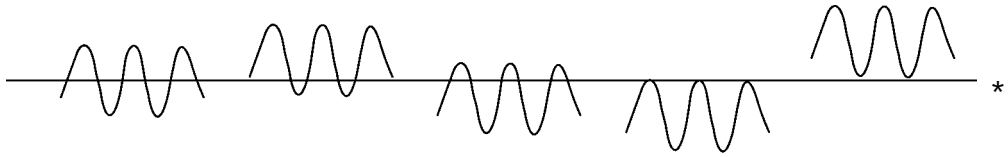
In the Line mode, the image signal is divided into black and white at the slice level, but its position changes up/down depending on the shade of the characters or that of the background.
If the characters are large and the amplitude of the image signal is wide at this time, the signal can be clearly divided into black and white at the slice level, even if its position moves up/down.
If the size of the characters is reduced, the amplitude will be narrowed, and consequently, the characters will be blurred or disfigured depending on the positional relations of the image signal and slice level.



(2) Fine enhancement

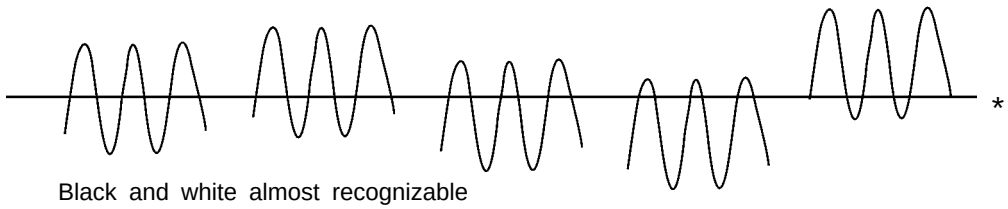
In order to properly reproduce small characters, the amplitude of the image signal is electrically amplified to correct the image signal so that the black and white can be recognized to some extent.

(Before Fine enhancement correction)



(After Fine enhancement correction)

*: Slice level



Black and white almost recognizable

* The background of the original also has concentration to some extent and the image signal changes very finely. Higher edge enhancement amplifies the image signal for the background. If the background color of the original is dark, therefore, the amplified image signal may be extended over the slice level, printing the black points. In this case, either weaken fine-character enhancement or lower scanning contrast of the original.

• Fine enhancement can be set in 4 steps depending on the Test mode.

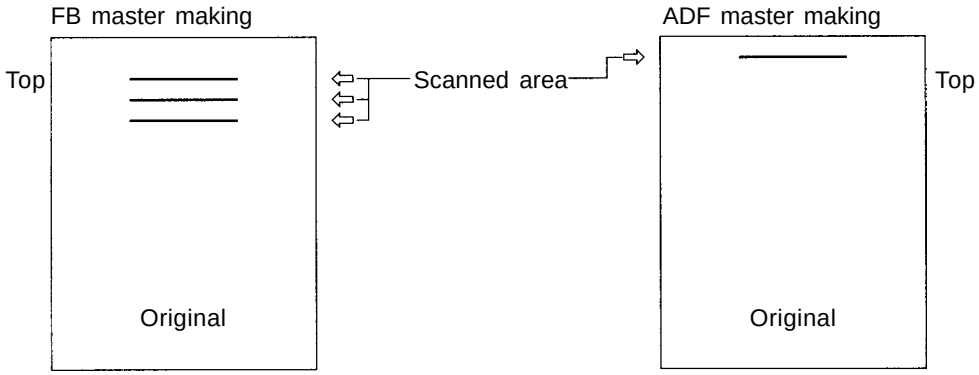
9. Automatic Scanning Contrast Control

Automatic scanning contrast adjustment is a function which scans the darkness of the original base prior to master making and selects the slice level according to the darkness so that the base will not appear (so that dirt on the base will be removed) even on originals with dark bases. Automatic scanning contrast adjustment only works with line-copy mode (when the “Auto” option is selected for original scanning darkness).

(1) Original base scanning

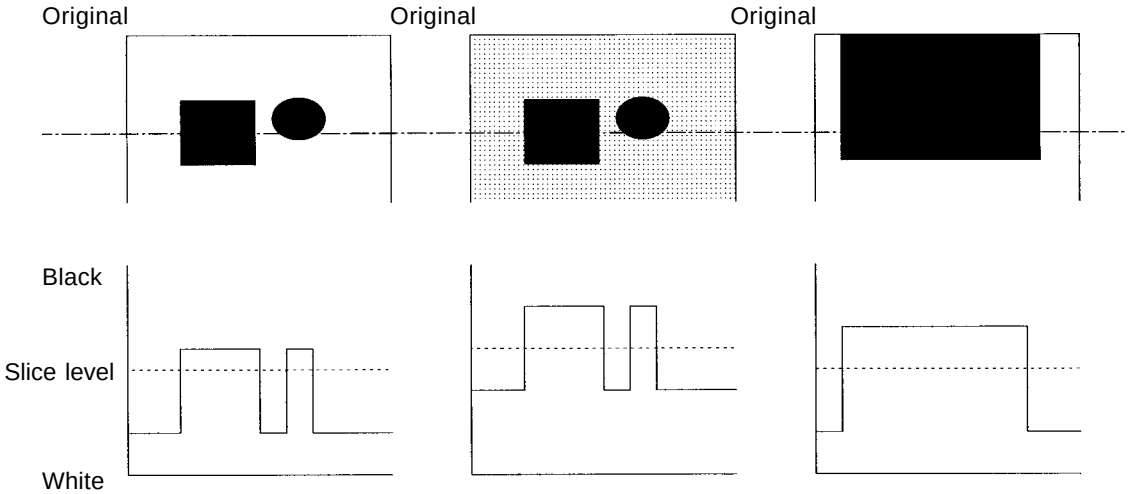
Press the master making <Start> key to read the darkness of the base at the leading edge of the original. During FB master making, three lines are scanned; during ADF master making, one line is scanned.

Note: Although the image scanner is A3-width, only the center of the original is scanned since the size of the original can not be recognized by the image scanner.



(2) Slice level setting

The slice level is set automatically based on the scanned base darkness. If the base is dark, the slice level setting will be made blacker accordingly. However, if the area recognized as the base is too dark, it may be an image line. In such cases, therefore, auto scanning contrast function is automatically turned off and the system switches to ordinary manual master making (scanning darkness center) (the display remains under the “Auto” setting).



Slice level is set based on base darkness.

The base is dark, so the slice level setting is made blacker.

The scanned base is dark, so automatic scanning contrast adjustment is automatically turned off.

MEMO

ADJUSTMENT

1. Gamma Compensation

- Setting Method -

(1) Start Test Mode, input a atest mode No. and press <START> key.
(2) To set the machine at the selected switch setting, press the <START> button.

- Principles Behind Adjustment -

Think of a printout as being divided between whitish area and blackish area.
To alter the master making darkness in the whitish area, change the “Gamma Curve White Level” value.
Conversely, to alter the master making darkmess in the blackish area, change the “Gamma Black Level” value.

Test Mode No.

251 Gamma Curve White Level (Photo, Doto photo OFF)
252 Gamma Curve Black Level (Photo, Doto photo OFF)
253 Gamma Curve White Level (Photo, Doto photo ON)
254 Gamma Curve Black Level (Photo, Doto photo ON)
255 Gamma Curve White Level (Duo, Doto photo OFF)
256 Gamma Curve Black Level (Duo, Doto photo OFF)
257 Gamma Curve White Level (Duo, Doto photo ON)
258 Gamma Curve Black Level (Duo, Doto photo ON)

Memory SW	0	1	2	3
Print Image	Light	Standard	Little Dark	Dark

2. Slice Level Adjustment

- Setting Method -

(1) Start Test Mode, input a Test mode No. and press <START> key.
(2) To set machine at the selected switch setting, press the <START> key.

Test Mode No.

259 Slice Level Adjustment (Line-Copy Mode)
260 Slice Level Adjusutment (Automatic Scanning Contrast Control)

Memory SW	8	9	A	B	C	D	E	F	0	1	2	3	4	5	6	7
Slice Level	Low ◄						Standard							► High		
	Dark ◄						Printed Matter Density							► Light		

3. Fine Enhancement Adjustment

- Setting Method -

(1) Start Test Mode, input a Test mode No. and press <START> key.
(2) To set machine at the selected switch setting, press the <START> key.

Test Mode No.

261 Fine Enhancement Adjustment

Memory SW	0	1	2	3
Fine Enhancement	Low	Standard	Little High	High

* You can set either one of the Memory switches 0 through 3; the default is “1”.

CHAPTER 21: ADVICE DISPLAYS

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ADVICE DISPLAYS

1. Trouble Messages (T Display)

Display	Details	How to Cancel
T1 CALL SERVICE ↓ TO RESUME OPERATION PRESS START KEY (while in master making.)	**Main Motor Lock** • In 3 seconds from turning ON of the Main motor, the A detection sensor light path is still held blocked. • In 8 seconds from turning ON of the Main motor, the A detection sensor is not blocked.	Press <ALL RESET> key. ↓ Press <START> key.
T2 CALL SERVICE	**Elevator Motor Lock** • In 15 seconds from turning ON of the Elevator motor in upward direction, the Elevator upper limit sensor is not pushed. • In 15 seconds from turning ON of the Elevator motor in downward direction, the light path of the Elevator lower limit sensor is not blocked. • In 3 seconds from turning ON of the Elevator motor in upward direction, the Elevator lower sensor is held blocked. • In 3 seconds from turning ON of the Elevator motor in downward direction, the Elevator upper limit sensor is held pressed down.	Press <ALL RESET> key.
T3 CALL SERVICE	**Clamp Error (1)** • In 4 seconds from turning ON of the Clamp solenoid in clamp retrial, the Clamp safety switch is held still pressed down. • In 4 seconds from turning OFF of the Clamp solenoid, the Clamp safety SW has not been pressed. • In 8 seconds from turning ON of the Clamp motor in opening direction in clamp retrial, the 180° Angular sensor has not detected magnet. • In 8 seconds from turning ON of the Clamp motor in closing direction in clamp retrial, the 0° Angular sensor has not detected magnet. * In any of the above cases, master making is performed to the end.	Press <ALL RESET> key. ↓ Press <START> key.
T4 CALL SERVICE	**Overflow** • When ink is in contact with the Overflow sensor. The Drum set switch need be pushed.	Overflow sensor OFF <CLEAN>

Display	Details	How to Cancel
T5 CALL SERVICE	**Print Positioning Motor Lock** • In 12 seconds from turning ON of the Print positioning motor, the Vertical centering sensor is not turned ON/OFF.	Press <ALL RESET> key.
T6 CALL SERVICE	**Pressure Detection Sensor Malfunction** • In 8 seconds from turning ON of the main motor, the Pressure detection sensor is not turned ON/OFF.	Press <ALL RESET> key.
T7 TURN MAIN POWER SW. OFF THEN ON	**Communication error between FR and Digitizer** • On occurrence of an error in communication between the System PCB and Digitizer III.	OFF -> ON
T8 TURN MAIN POWER SW. OFF THEN ON	**Communication error between System PCB and Panel PCB** • On occurrence of an error in communication between the System PCB and the Panel PCB.	OFF -> ON
T9 TURN MAIN POWER SW. OFF THEN ON	**Communication error between FR and the Sorters** • On occurrence of an error in communication between the System PCB and the Sorter (TM)	OFF -> ON
T10 TURN MAIN POWER SW. OFF THEN ON	**Malfunction Image Processing PCB** • When the scanning contrast adjustment signal is not output from the image processing PCB.	OFF -> ON
T11 CALL SERVICE	**Pressure Control Motor Lock** • In 100ms from turning ON of the Pressure control motor, the Encoder sensor cannot detect a pulse. • In 5 seconds from turning ON of the Pressure control motor, the Pressure centering sensor is not turned ON/OFF.	Press <ALL RESET> key.
T12 CALL SERVICE	• Malfunction of Trimming PCB • When the TOP signal is not output from the Trimming PCB 2	OFF -> ON
T13 CALL SERVICE	**Cutter Motor Lock** • After master cutting retrial with the drum held in C-2 position, when the Master positioning sensor is in light-receiving state. (Master cutting has failed in the 2nd time.)	Drawer connector OFF (Pull out the drum.)
T14 CALL SERVICE	**Clamp Error (2)** • If the actuator of the Clamp safety switch is not depressed when the Clamp solenoid is not in operation.	Press <ALL RESET> key.

Display	Details	How to Cancel
T15 CALL SERVICE	**Flat Bed Read Pulse Motor Lock** • If the Image scanner home position sensor does not detect the Image scanner within **18898 pulses** after the Flat bed read pulse motor is activated. • If the Image scanner ADF Shading sensor does not detect the Image scanner within **15748 pulses** after the Flat bed read pulse motor is activated. • If the scanner home position sensor does not detect the Image scanner within 14,551 pulses(462 mm worth) after the Flat bed read pulse motor is activated during prescanning. • If the Image scanner is not release from the Image scanner home position sensor within **314 pulses** after the Flat bed read pulse motor is activated. • If the Image scanner is not released from the Image scanner ADF Shading sensor within **314 pulses** after the Flat bed read pulse motor is activated.	Press <ALL RESET> key.
T16 CALL SERVICE	**Position C Sensor Malfunction** • If the Position C sensor status has not been changed from ON to OFF (or OFF to ON) within **8 seconds** from the start of the Main Motor.	Press <ALL RESET> key.
T17 CALL SERVICE REPLACE BAT-TERY	**Replace Battery** • When the battery voltage is less than 2.4 V at power-on, all reset, or end of operation.	Power OFF -> ON

Display	Details	How to Cancel
T18 TURN MAIN POWER SW. OFF THEN ON	**Sorter Error** • If an error signal is received from the sorter.	Power OFF -> ON
T19 CALL SERVICE	**Thermal Pressure Motor Lock** • If the TPH Pressure switch has not been depressed within **4 seconds** after the TPH Pressure motor was activated to lower the TPH. • If the TPH Pressure switch has not been released within **4 seconds** after the TPH Pressure motor was activated to raise the TPH.	Press <ALL RESET> key.
T20 CALL SERVICE	**Wing Motor Lock** • If neither of the Jump wing sw1 or sw2 has been depressed within **5 seconds** after the Wing motor was activated. • If neither of the Jump wing sw1 or sw2 has been released within **5 seconds** after the Wing motor was activated.	Press <ALL RESET> key.
T30 CALL SERVICE	**P. -F. Tray Slide Pulse Moto**r • When the Paper feed tray position sensor is not turned on/ off within 165 pulses(approx. 3 second) after the P. -F. tray slide pulse motor is turned on.	Press <ALL RESET> key.
T50 CALL SERVICE	**Connect "Copy/Master" Counter** • When the copy counter or the master counter has not been connected.	Electromagnetic counter setting signal L (Connect an electromagnetic counter.)
T68 CALL SERVICE	**SF3000 Power Supply Malfunction** • When no power is supplied to the SF3000.	SF3000 OK signal H(SF3000 power-on)
T78 CALL SERVICE	**Machine Model Selection Error** • When there is no machine type which corresponds to the code having been set in System PCB.	Set the switch and turn OFF and ON the power
T79 CALL SERVICE	**Destination Spec. Code Error** • When the code set (DIP switch) does not match the model set with the Hex. switch.	Set the switch and turn off and on the power

2. Trouble Messages (Others)

Display	Details	How to Cancel
MAINTENANCE <MASTER> CALL SERVICE	• When the number of masters has reached the set value in the Maintenance mode at power-on.	Clear the master count value and press the ALL RESET key.
MAINTENANCE <PRINT> CALL SERVICE	• When the number of printed sheets has reached the set value in the Maintenance mode at power-on.	Clear the printed sheets count value and press the ALL RESET key.
CHECK PAPER FEED AREA	• If the safety switch over or under the Paper feed tray is activated. • When the P. -F. tray slide safety switches are pressed (Normally released)	Press Safety SW. (Remove obstacles.) Release the safety switches.
PAPER MISFEED CHECK PAPER FEED AREA AND PRESS ALL RESET KEY	**Paper Jam in the First Paper Feed Area** • If the Paper sensor has not detected paper while the Position A sensor detects the A position three times.	Press <ALL RESET> key.
PAPER JAM CHECK PAPER FEED AREA	**Paper Jam in the Second Paper Feed Area** • If at the Drum A position, the Paper receiving sensor 1 does not detect paper and at the next Drum A position, the Paper sensor detects the paper.	Make either Paper Sensor OFF or Press <ALL RESET> key.
PAPER JAM ON DRUM (PRINT CYLINDER) REMOVE PAPER	**Paper Jam under the Drum** • If the Paper receive sensor 1 does not detect paper at the Drum A position and the Paper sensor does not detect the paper at the next Drum A position.	Drum set SW OFF → ON or press <ALL RESET> key.
PAPER JAM UNDER DRUM PULL OUT DRUM (PAPER JAM REMOVE PAPER UNDER PRINT CYLINDER)	**Paper Jam around Paper Receiving Sensor 1&2** • If the Paper receiving sensor 1 detects paper when the Drum rotates at a certain Drum angle or the Pressure detection sensor detects the Pressure disc. • When the light path of the Paper receiving sensor 2 is continuously shut off while the drum rotates once.	Turn OFF Paper receiving Sensors 1&2 or Press <ALL RESET> key.
NO MASTER ON DRUM PRESS ALL RESET KEY AND MAKE A NEW MASTER	**No Master on Drum** • If the Master loading sensor does not detect master on the drum at the Drum C-1 position when the printing starts.	Press <ALL RESET> key.
ORIGINAL MISFEED OPEN ADF COVER AND RESET ORIGINAL	**Original Misfeed** • If the actuator of the Registration sensor is not opened within **1.35 seconds** after the Original pickup motor was turned on.	ADF SW OFF → ON
ORIGINAL JAM RESET ORIGINAL / 1	• If the Original IN sensor has not detected an original within **630 pulses** after the Read pulse motor was turned on. • In ADF original setting, <u>when the ADF original IN sensor has been blocked from the beginning.</u>	ADF SW OFF → ON

Display	Details	How to Cancel
ORIGINAL JAM RESET ORIGINAL /3	**Original Jam at the Exit** Displayed after the master has been loaded onto the Drum: • If the Original OUT sensor has not detected an original within **1,890 pulses** after the Read pulse motor was turned on.	ADF SW OFF → ON
ORIGINAL JAM REMOVE ORIGINAL. /2	**Oversize** Displayed after the master has been loaded onto the Drum: • If the light path of the Original IN sensor is blocked for **14,803 pulses** after the Read pulse motor is turned on.	ADF SW OFF → ON
MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL	**Master Mis-Feed** Displayed after the master has been loaded onto the Drum in the master making or confidential process: • If the Master positioning sensor has not detected master material within **787 pulses** (**536 pulses** in confidential process) after the Loading pulse motor started following the master cutting operation. Displayed to interrupt the machine operation when the Master loading button was pressed: • If the Master positioning sensor has not detected master material within **1260 pulses** after the Loading pulse motor was turned on.	Master loading unit SW OFF → ON
CLAMP ERROR REMOVE MASTER ROLL THEN RE-INSTALL ↓ TO RETURN OPERATION PRESS START KEY	**Master Loading Error (onto the Drum)** • If the Master load sensor does not detect master at the Drum C-1 position during loading of the master on the Drum.	Master loading unit SW OFF → ON Press <START> key. ↓
MASTER CUT ERROR REMOVE DRUM (PRINT CYLINDER) AND CHECK MASTER	**Master Cut Malfunction** • When the drum is at the C-2 position and the Master positioning sensor is not sensing the light(without the master) at master cut retry(the master was cut in the 2nd time)	Drawer connector OFF (Pull out drum.)
REMOVE CUT MASTER STRIP	**A Cut Piece of Master Remains inside the Machine** Displayed: • If the Master positioning sensor detects master material (the reflected light) just after the master cut operation is completed.	Master positioning sensor OFF
DISPOSAL ERROR REMOVE DRUM (PRINT CYLINDER) AND DISCARD MASTER ↓ TO RETURN OPERATION PRESS START KEY	**Master Removal Error** Displayed after the Image scanning and Master making operations are completed or in the confidential operation: • If the Master removal sensor does not detect a removed master while the Drum rotates from C-1 to A position, during master removal operation. • If the light path of the Master removal sensor is still blocked by a removed master when the Vertical transport motor stops. * The above checking operation is performed when a master exists on the drum.	Drum set SW OFF → ON ↓ Press <START> key.

Display	Details	How to Cancel
REMOVE JAMMED MASTER IN DISPOSAL UNIT	**Removed Master Jammed at the entrance of Master disposal box** • If the light path of the Master removal sensor is blocked at the start of master-making operation. • If the light path of the Master removal hook sensor is not blocked at the start of master-making operation.	Master removal sensor OFF, Master removal hook sensor ON
EMPTY DISPOSAL BOX	**Empty Disposal Box** Displayed after the machine operation is finished: • If the disposed master is detected 50 times (30 for A3 models) by the Master removal sensor after the Disposal box was emptied.	Disposal box set SW OFF → ON, Disposal box master sensor OFF
CLOSE SHEET FEEDER COVER AND PRESS ALL RESET KEY	**"SF3000" Bulk Sheet Feeder Error** • When the Bulk sheet feed cover setting SW is not pressed	Turn ON the Bulk sheet feed cover setting SW and, then, press <ALL RESET> key.
CHECK SORTER'S PANEL DISPLAY	**CHECK SORTER PANEL** • When the sorter has a error.	Reset the error of the sorter.
PAPER JAM IN SORTER CHECK SORTER	**Sorter Error - Paper jammed in Sorter** • If paper has jammed in the sorter.	Remove the jamming paper in the sorter.
CLOSE SORTER'S COVER	**Sorter Error - Sorter door (or cover) is open** • If the door (or cover) of the sorter is open.	Cover SW ON Connection SW ON Door SW ON
PAPER REMAINING IN SORTER REMOVE PAPER	**Sorter Error - Paper remains in Sorter** • When the paper is remaining in the sorter bin when the sorter mode is turned on at the TM5000 • When the sorter mode is selected, which is different from the mode selected when the paper in the sorter bin is stored at the TM5000 • When the auto staple is set at the TM5000 when the sorter bin has the paper.(Not detected by the TM2500)	Remove paper and, then, turn ON Cover SW (door SW).
SORTER BIN FULL REMOVE PAPER	**Sorter Error - Sorter bins are full** Displayed to interrupt the machine operation: • If the sort bins are full of sorted sheets.	Remove paper and, then, turn ON Cover SW (door SW).
STAPLER ERROR CHECK STAPLER SORTER	**STAPLER ERROR. CHECK STAPLER** • When there is a no-needle error at the time of setting the Auto stapler at the TM5000	Replenish the needles to the Stapler.
THIS SIZE OF PAPER IS NOT ACCEPTABLE FOR SORTER	**PAPER SIZE UNAVAILABLE FOR SORTER** Displayed to prevent the machine operation: • When the paper is set on the Paper feed tray, whose size is different from the paper stored in the TM5000. • When the paper is set at the sorter panel, whose size is different from the paper stored in the TM5000.	Change the paper on the Paper feed tray. Alter the set paper size at the TM5000 panel.

3. Setting Confirmation Messages

Display	Details	How to Cancel
CLOSE FRONT COVER	**Close Front Cover** • If the metal plate is not attached to the Front cover set sensor.	Front cover set sensor ON
ADD PAPER	**Add Paper** • If the light path of the Paper detection sensor is open.	Paper detection sensor ON
SET DRUM IN PLACE (INSTALL PRINT CYLINDER)	**Set Drum in Place** • If the actuator of the Drum set switch is not depressed.	Drum set SW ON
WRONG-SIZE DRUM (PRINT CYLINDER) INSTALLED	**Drum Size Error** • If a wrong size drum is set in the machine.	Remove the drum.
WRONG-TYPE DRUM (PRINT CYLINDER) INSTALLED	**Drum Brand Error** • If a wrong brand drum is set in the machine.	Remove the drum.
INSTALL INK CARTRIDGE	**Set Ink Cartridge in Place** • If the actuator of the Ink bottle switch is not depressed.	Ink bottle SW ON
WRONG-TYPE INK CARTRIDGE INSTALLED	**Ink Cartridge Brand Error** • If a wrong type of ink cartridge is set in the machine.	Remove the ink bottle.
SET (INSTALL) MASTER DISPOSAL BOX IN PLACE	**Set Master Disposal Box in Place** • If the actuator of the Disposal box set switch is not depressed.	Disposal box set SW ON
CLOSE SCANNER TABLE	**Close Scanner Table** • If the safety switch is not pressed by the Scanner table.	Scanner table set SW ON Interlock SW ON
CLOSE ADF COVER	**Close ADF Unit** • If the actuator of the ADF unit set switch is not depressed.	ADF unit set SW ON
CLOSE MASTER LOADING UNIT	**Close Master Loading Unit** • If the actuator of the Master loading unit switch is not depressed.	Master loading unit SW
SET LEAD EDGE OF MASTER UNDER GREEN FILM	**Set Leading Edge of Master Under Green Films** • If the Master detection sensor does not detect master material (the reflected light).	Master detection sensor ON
INSERT CARD IN KEY/CARD COUNTER	**Insert Card into Key/Card Counter** • If an operator card is not set in the Key/Card counter.	Set a card.

4. Change-of-Consumables Messages

Display	Details	How to Cancel
REPLACE INK CARTRIDGE	**Replace Ink Cartridge** • If the Ink sensor does not detect ink in the Squeegee unit within **30 seconds** after the Inking motor was started.	Ink bottle set SW OFF → ON
REPLACE MASTER ROLL	**Replace Master Roll** • If the black tape attached at the end of the Master roll has been detected by the Master end sensor during master making or confidential operation.	Master detection sensor OFF → ON (Master roll need to be replaced.)

MEMO

CHAPTER 22: TEST MODE

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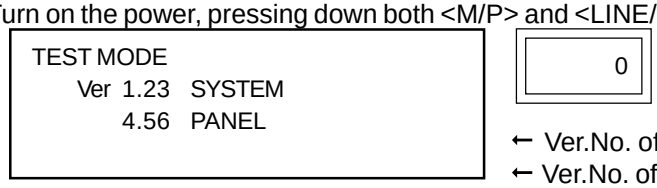
TEST MODE

1. Operation Procedures

(1) Starting Up Test mode

Turn on the power, pressing down both <M/P> and <LINE/PHOTO> buttons on the main panel.



(2) HOW TO OPERATE

<1> Input a test mode No. by using panel-keys.

(For example, when No.64 separation fan has been selected.)

<2> Press <START> key to start operation.

<3> Press <START> key one more time to stop operation.

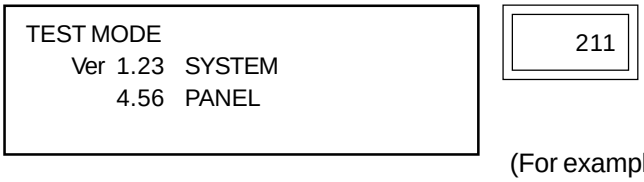
<4> To select another Test mode, clear the set Test No. by pressing the <C> or <STOP> button and select another Test No.

(3) Exiting from the Test mode

To exit from a Test mode, clear the set Test No. by pressing the <C> or <STOP> button and then press the <ALL RESET> button.

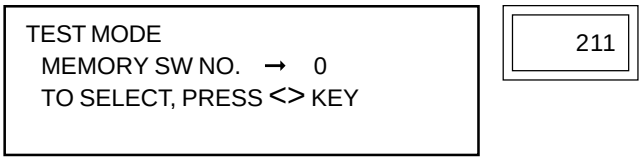
(4) HOW TO OPERATE TEST MODE NO'S 211 TO 261 (MEMORY SW'S)

<1> Starting Test mode, input a Test mode No. and press <START> key.



(For example, when Image Elongation/Shrinkage correction has been selected)

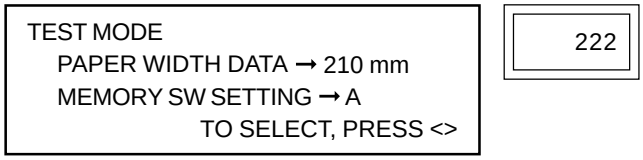
<2> To change the Memory switch setting, press the ◁ or ▷ key of the PRINT POSITION BUTTON to more the number up or down.



<3> To set the machine at the selected switch setting, press the <START> button and then <C> or <STOP> button and then <ALL RESET> button to exit from the Memory Switch adjustment.

(5) Adjusting the Paper Width Potentiometer (Test No. 222)

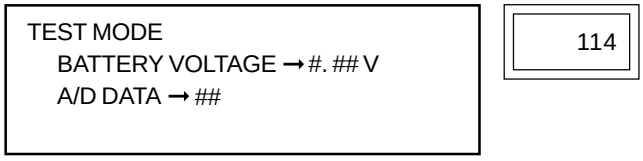
Input a test mode No. by using panel-keys. If executed(press the START key), the Potentiometer Adjustment screen will be displayed on the LCD.



Put the A4 paper on the paper feed tray vertically and adjust the Memory switch so that the DETECTION DATA value will be 210 mm.
To alter the MEMORY SW value, press the ◁ or ▷ key. To settle the MEMORY SW value, press the START key.

(6) Displaying the A/D Data (Test No. 114, 115, 116)

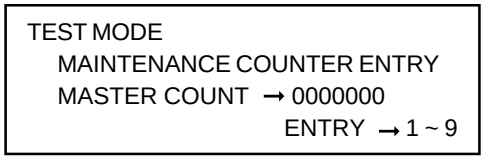
Input a test mode No. by using panel-keys. If executed(press the START key), the A/D Data Display screen will be displayed on the LCD.



The A/D data is displayed in the HEX code.(00h to FFh)

(7) Setting the Target Maintenance Master/Print Count Value (Test No. 150, 151)

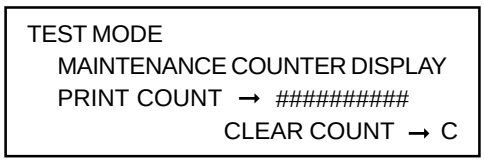
Input a test mode No. by using panel-keys. If executed(press the START key), the Target Count Setting screen will be displayed on the LCD.



- Use the panel-keys to set the master/print count. The lower two digits(master count) and lower three digits(print count) are fixed. Therefore, the maximum master count and print count are 999,900 and 9,999,000, respectively.
- The count can be cleared by pressing the <C> key.
- Pressing the <START> key or <STOP> key settles the displayed count and exits the Setting screen.

(8) Checking/Clearing the Maintenance Master/Print Count Value (Test No. 93, 94)

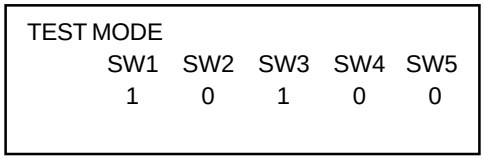
Input a test mode No. by using panel-keys. If executed(press the START key), the then-current count value will be displayed on the LCD.



- The count can be cleared by pressing the <C> key.
- If you press <C> key to clear the count and press the <START> key, you will exit the Setting screen, clearing the counter value.

(9) Displaying the Bottle Set Switch (Test No. 125)

Input a test mode No. by using panel-keys. If executed(press the START key), the status of the five Bottle Set switches will be displayed on the LCD.



- The status displayed for each Bottle Set switch is 0: OFF and 1: ON.
- The display is updated every time the status of the Bottle Set switch is altered.

2. Testing Sensor and Switch

The current states of sensors and switches are indicated with buzzer sound:
Detection : 0.1 second interval beep
No detection : 0.5 second interval beep

No.	Test Component	Detection Status	Remarks
1	Unused		
2	Paper size sensor	Reflected light is detected (for paper provided.)	
3	Elevator lower limit sensor	Light path is blocked (at lower limit)	
4	Paper feed pressure switch	The switch is released (for standard level.)	
5	Master loading button	This button is pressed.	
6	Paper sensor	Light path is blocked (for paper provided.)	
7	Pressure detection sensor	Light path is blocked (for disc provided.)	
8	Position A sensor	Light path is blocked.	
9	0° angular sensor	Magnetism is detected	
10	180° angular sensor	Magnetism is detected	
11	Position C sensor	Light path is blocked.	
12	Feed-tray down button	This button is pressed.	
13	Clamp safety switch	This switch is pressed (for standby position.)	
14	Master removal hook sensor	Light path is blocked.	
15	Master positioning sensor	Reflected light is detected.	
16	Drum home position button	This button is pressed.	
17	unused		
18	Drum set switch	This switch is pressed (for setting.)	
19	Paper receiving sensor 1	Light path is blocked (for paper provided.)	
20	Paper receiving sensor 2	Light path is blocked (for paper provided.)	
21	Scanner table set switch	This switch is pressed (for closure.)	
22	Vertical centering sensor	Light path is blocked.	
23	Master end sensor	Light path is blocked (for end tape provided.)	
24	Paper feed clutch sensor	Light path is blocked.	
25	Paper feed det sensor	Light path is blocked (for paper provided.)	
26	Jump wing switch 1	This switch is pressed.	
27	Jump wing switch 2	This switch is pressed.	
28	Master removal sensor	Light path is blocked (for master provided.)	
29	Master loading unit switch	This switch is pressed (for closure.)	
30	Front cover set sensor	Metal plate is detected (for closure.)	
31	TPH home position switch	This switch is pressed.	
32	TPH pressure switch	This switch is pressed.	
33	Disposal box set switch	This switch is pressed (for setting.)	
34	ADF original detection sensor	This sensor is operated (for original provided.)	Applicable only to ADF unit mounting type.
35	Original registration sensor	This sensor is operated (for original provided.)	Applicable only to ADF unit mounting type.
36	Original IN sensor	Light path is blocked (for original provided.)	Applicable only to ADF unit mounting type.
37	Ink sensor	Ink is detected.	
38	Overflow sensor	Ink is detected.	
39	Main motor interlock switch	This switch is pressed	
40	Paper feed safety switch	This switch is detached (for any abnormality occurrence.)	

No.	Test Component	Detection Status	Remarks
41	Paper feed cassette sensor 1	Magnetism is detected.	
42	Paper feed cassette sensor 2	Magnetism is detected.	
43	Paper feed cassette sensor 3	Magnetism is detected.	
44	Paper feed cassette sensor 4	Magnetism is detected.	
45	Original OUT sensor	This sensor is operated (for original provided.)	Only to ADF unit mounting type.
46	ADF switch	This switch is pressed.	Only to ADF unit mounting type.
47	Master detection sensor	Reflected light detected (for master provided.)	
48	Master loading sensor	Reflected light detected (for master provided.)	
49	Scanner home position sensor	Light path is blocked.	
50	Scanner ADF shading sensor	Light path is blocked.	
51	Stage cover sensor	Light path is blocked (for closure.)	
52	FB original detection sensor	Reflected light detected (for original provided.)	
53	Pressure control sensor	Light path is blocked (for metal plate provided.)	
54	Disposal box master sensor (Master removal detection sensor)	Light path is blocked (for master provided.)	
55	Paper detection sensor	Reflected light is detected (for paper provided)	
56	P. -F. Tray Position Sensor	Light path is blocked	
57	Unused		
58	Unused	.	
59	Option PCB detection signal	Option PCB is provided.	

3. Testing Motor and Solenoid

Every pushing of <START> key turns the following ON/OFF:

No.	Test Item	Remarks
60	15rpm drum rotation	Main motor safety SW has to be held pressed. No.62 serves as <Print Speed Adj.> key to vary speed.
61	30 rpm drum rotation	
62	Variable speed drum rotation	
63	Drum internal lamp ON	
64	Separation fan	
65	Write pulse motor	
66	Loading pulse motor	
67	Paper feed clutch	Paper feed clutch sensor is held ON and Stack paper feed SW OFF.
68	Pressure solenoid	
69	Suction fan	
70	Master removal fan	
71	Master removal vertical transport motor	
71	Master removal solenoid	
72	Loading fan	
73	Clamp solenoid	
74	Lock solenoid	
75	Unused	
76	Original pickup solenoid	Only to ADF unit mounting type.
77	Thermal power control	
78	Original pickup motor	Only to ADF unit mounting type.
79	Image scanner LED lighting	
80	Wing motor	

4. Memory Clear and Counter Stop, etc.

No.	Details of Test Mode
90	**Partial Memory Clear** Certain portion of RAM contents in the System PCB, such as Jam and Trouble messages, will be initialized. (The same operation as when turning the power ON while pressing All Reset button.)
92	**Prevention of the following operations: master and copy counting, Key/card counter** • In normal operation, the Master count and Copy count signals will not be output, allowing a service technician to print without increasing the digit of the Master and Copy counters. • The machine will be released from this condition when the power is turned off. **[CAUTION]** **Do not use this mode when TM5000 is in connection.**
93	**Maintenance master counter clear** Displays/clears the maintenance master counter value. The <C> key clears the count value and the <START > key settles it.
94	**Maintenance print counter clear** Displays/clears the maintenance master print counter value. The <C> key clears the count value and the <START> key settles it.
97	**All Memory Clear** All RAM contents in the System PCBs, excluding Memory switch setting by Test modes, will be initialized. Master disposal count is not cleared. **NOTE: This test mode must be done each time System ROM, System PCB, or Battery is changed.**
98	**Memory Switch Clear** Memory switch settings by Test modes will be initialized. **This test mode must be done each time System PCB is changed.** **[CAUTION]** **Do not use this test mode in normal operation.** **All the programmed Memory switch settings in the machine will be initialized.**

5. Sequential Operation Test

No.	Details of Test Mode
101	**Ink supply operation** Until the ink sensor gets ON, the main motor and the ink motor are held ON. Ink sensor ON → confidential op. → press application ´ 30 times → Stopped on A detection position. (For FB type, further, the image scanner shuttles between the Image Scanner home position sensor and the ADF shading sensor at a speed of 50%.)
102	**Elevator operation** Operation starts when the feed tray DOWN button is pressed. UP → Elevator upper limit sensor ON → stop Upper limit position → DOWN → elevator lower limit sensor ON → stop Operation stops when the feed tray DOWN button is released.
103	**P.-F. Tray Slide pulse motor operation (A3 only)** Continuous sliding operation is performed after detecting P. -F. Tray Position Sensor.
104	**Clamp open/close continuous operation** Rotate Drum to Home position → clamp plate opened → one second halt → clamp plate closed → Rotate Drum to Home position → clamp plate opened
107	**Ink-free printing operation** Continuous printing is performed without inking.
108	**Flat bed read pulse motor (image scanner) continuous operation** (speed at 100%) Image Scanner home position sensor position (2 seconds halt) → rightward shift → ADF shading sensor position (2 sec. halt) → rightward shift → ADF read-in position (2 sec. halt) → leftward shift → Image Scanner home position sensor position (2 sec. halt) → rightward shift → .....
109	**Machine aging operation** Drum rotation at 3000 times → Stop at A detection
111	**Thermal pressure motor operation** When TPH home position SW is ON: DOWN → TPH pressure SW ON → stop When TPH pressure SW is ON: UP → TPH home position SW ON → stop
112	**Cutter motor one-cut operation**
113	**FB type ADF original feed operation** (Image scanner does not operate.) ADF original det. sensor ON → ADF original setting → ADF read-in operation → ADF original det. sensor ON → ADF original setting ...

6. Other Test mode

No.	Details of Test Mode
114	**Battery remaining capacity** The battery remaining capacity is displayed on the LCD panel in terms of voltage and A/D values. Display range: 0 to 9.99 V, A/D value: 0 to FF
115	**Drum internal thermistor display** The drum internal thermistor value is displayed on the LCD panel in terms of A/D value. Display range: 0 to 999C°, A/D value: 0 to FF
116	**TPH thermistor display** The TPH thermistor value is displayed on the LCD panel in terms of C° and A/D value. Display range: 0 to 999C°, A/D value: 0 to FF
117	**Thermal print head check operation 1** Makes a master of Test Pattern 1 memorized inside the Image processing PCB.
118	**Thermal print head check operation 2** Makes a master of Test Pattern 2 memorized inside the Image processing PCB.
119	**Thermal print head check operation 3** (checkered) Makes a master of Test Pattern 3 memorized inside the Image processing PCB.
120	**Thermal print head check operation 4** (checkered) Makes a master of Test Pattern 4 memorized inside the Image processing PCB.
125	**Ink Bottle Set switch status display** Displays the status of the Ink Bottle Set switches 1 through 5 at the same time. Displays 0: OFF or 1: ON for each switch. The display on the LCD is updated every time the switch status changes.
126	**Ink Bottle Set SW1** Set to detect.
127	**Ink Bottle Set SW2** Set to detect.
128	**Ink Bottle Set SW3** Set to detect.
129	**Ink Bottle Set SW4** Set to detect.
130	**Ink Bottle Set SW5** Set to detect.
131	**Suction clutch operation** Main motor rotates at 15rpm. Every pushing of <*> key turns ON/OFF the suction clutch.
150	**Target Maintenance master count set** Sets the target master count for displaying a maintenance call for the master making system.(“0” turns off the function; in increments of 100) Starts counting from the time of setting the number of masters.
151	**Target Maintenance print count set** Sets the target print count for displaying a maintenance call for the printing system.(“0” turns off the function; in increments of 1,000) Starts counting from the time of setting the number of sheets.

7. Memory Switch

Various kinds of setting concerning master making, etc. are stored in Memory switches. Use <Print Position Adjust> key to change setting.

No.	DETAILS OF MEMORY SW

211 **Image Elongation/Shinkage Correction (Flat bed read pulse motor)**

Memory SW	9	A	B	C	D	E	F	O
Expansion (mm)	-7	-6	-5	-4	-3	-2	-1	0
	1	2	3	4	5	6	7	8
	+1	+2	+3	+4	+5	+6	+7	+8

Decrease ◄——— Expansion ———► Increase

212 **Horizontal Scanning Position Adjustment (FB)**

Memory SW	9	A	B	C	D	E	F	O
Amount (mm)	-3.5	-3.0	-2.5	-2.0	-1.5	-1.0	-0.5	0
	1	2	3	4	5	6	7	8
	+0.5	+1.0	+1.5	+2.0	+2.5	+3.0	+3.5	+4.0

Shift to Left ◄——— Read Position ———► Shift to Right

213 **Scanning Start Position Adjusument (FB)**

Memory SW	9	A	B	C	D	E	F	O
Amount (mm)	-2.8	-2.4	-2.0	-1.6	-1.2	-0.8	-0.4	0
	1	2	3	4	5	6	7	8
	+0.4	+0.8	+1.2	+1.6	+2.0	+2.4	+2.8	+3.2

Decrease ◄——— Skip Amount ———► Increase

214 **Scanning Start Position Adjustment (Book Processing)**

Distance Control between Scanner ADF Shading Sensor Position and Original Read Start Position

Memory SW	9	A	B	C	D	E	F	O
Amount (mm)	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0
	1	2	3	4	5	6	7	8
	+0.2	+0.4	+0.6	+0.8	+1.0	+1.2	+1.4	+1.6

Decrease ◄——— Skip Amount ———► Increase

216 **Image Elongation/Shrinkage Correction (ADF read pulse motor)**

Memory SW	9	A	B	C	D	E	F	O
Expansion (mm)	-7	-6	-5	-4	-3	-2	-1	0
	1	2	3	4	5	6	7	8
	+1	+2	+3	+4	+5	+6	+7	+8

Decrease ◄——— Expansion ———► Increase

No.	DETAILS OF MEMORY SW

217 **Horizontal Scanning Position Adjustment (ADF)**

Memory SW	9	A	B	C	D	E	F	O
Amount (mm)	-3.5	-3.0	-2.5	-2.0	-1.5	-1.0	-0.5	0
	1	2	3	4	5	6	7	8
	+0.5	+1.0	+1.5	+2.0	+2.5	+3.0	+3.5	+4.0

Shift to Left ◄——— Read Position ———► Shift to Right

218 **Scanning Start Position Adjustment (ADF)**

Memory SW	9	A	B	C	D	E	F	O
Amount (mm)	-2.8	-2.4	-2.0	-1.6	-1.2	-0.8	-0.4	0
	1	2	3	4	5	6	7	8
	+0.4	+0.8	+1.2	+1.6	+2.0	+2.4	+2.8	+3.2

Decrease ◄——— Skip Amount ———► Increase

221 **Image Elongation/Shrinkage Correction (Write pulse motor)**

The set value is represented by an elongation/shrinkage amount of the image in the length of the B4 size.

Memory SW	9	A	B	C	D	E	F	O
Amount (mm)	-7.0	-6.0	-5.0	-4.0	-3.0	-2.0	-1.0	0
	1	2	3	4	5	6	7	8
	+1.0	+2.0	+3.0	+4.0	+5.0	+6.0	+7.0	+8.0

Decrease ◄——— Expansion ———► Increase

222 **Paper Width Potentiometer Adjustment**

Set the A4 paper on the paper feed tray and adjust the paper side guide.
Check the data display and set the Memory switch so that the data will be 210 mm.

Memory SW	9	A	B	C	D	E	F	O
Adjustment Value (mm)	-7	-6	-5	-4	-3	-2	-1	0
	1	2	3	4	5	6	7	8
	+1	+2	+3	+4	+5	+6	+7	+8

Decrease ◄——— Adjustment Value ———► Increase

223 **Separation Fan Air Flow Rate Control**

Memory SW	0	1	2	3
Power-on Time %	100%	70%	50%	30%

* You can set either one of the Memory switches 0 through 3.

No.	DETAILS OF MEMORY SW

224 **Master Removal Full Capacity Setting**

Memory SW	0	1	2	3
Full Capacity (B4 Machine) (A4 Machine) (Legal Machine)	50	40	30	20
Full Capacity (A3 Machine) (Ledger Machine)	30	20	10	30
Full Capacity (A4 W Drum)	42	28	14	42

* You can set either one of the Memory switches 0 through 3.

232 **Paper Feed Clutch OFF Delay Time Setting: (STANDARD)**

Memory SW	9	A	B	C	D	E	F	O
Adjustment Value (mm)	-7	-6	-5	-4	-3	-2	-1	0
	1	2	3	4	5	6	7	8
	+3	+6	+9	+12	+15	+18	+21	+24

◄——— Paper Feed Timing ———► Delay

234 **Paper Feed Clutch OFF Delay Time Setting: (CARD)**

Memory SW	9	A	B	C	D	E	F	O
Adjustment Value (mm)	-7	-6	-5	-4	-3	-2	-1	0
	1	2	3	4	5	6	7	8
	+3	+6	+9	+12	+15	+18	+21	+24

◄——— Paper Feed Timing ———► Delay

236 **Paper Feed Clutch OFF Delay Time Setting: (THIN)**

Memory SW	9	A	B	C	D	E	F	O
Adjustment Value (mm)	-7	-6	-5	-4	-3	-2	-1	0
	1	2	3	4	5	6	7	8
	+3	+6	+9	+12	+15	+18	+21	+24

◄——— Paper Feed Timing ———► Delay

238 **Paper Feed Clutch OFF Delay Time Setting: (CUSTOM)**

Memory SW	9	A	B	C	D	E	F	O
Adjustment Value (mm)	-7	-6	-5	-4	-3	-2	-1	0
	1	2	3	4	5	6	7	8
	+3	+6	+9	+12	+15	+18	+21	+24

◄——— Paper Feed Timing ———► Delay

240 **Paper Feed Clutch OFF Delay Time Setting with Special Paper Feed Unit Used:**

Memory SW	9	A	B	C	D	E	F	O
Adjustment Value (mm)	-7	-6	-5	-4	-3	-2	-1	0
	1	2	3	4	5	6	7	8
	+3	+6	+9	+12	+15	+18	+21	+24

◄——— Paper Feed Timing ———► Delay

8. Memory Switch (Image Adjustment)

<table>
<tr><th>No.</th><th>DETAILS OF MEMORY SW</th></tr>
<tr><td>251</td><td>Gamma Curve White Level (Photo, Doto photo OFF)
<table>
<tr><td>Memory SW</td><td>0</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Print Image</td><td>Light</td><td>Standard</td><td>Little Dark</td><td>Dark</td></tr>
</table>
* You can set either one of the Memory switches 0 through 3; the default is “1”.</td></tr>
<tr><td>252</td><td>Gamma Curve Black Level (Photo, Doto photo OFF)
<table>
<tr><td>Memory SW</td><td>0</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Print Image</td><td>Light</td><td>Standard</td><td>Little Dark</td><td>Dark</td></tr>
</table>
* You can set either one of the Memory switches 0 through 3; the default is “1”.</td></tr>
<tr><td>253</td><td>Gamma Curve White Level (Photo, Doto photo ON)
<table>
<tr><td>Memory SW</td><td>0</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Print Image</td><td>Light</td><td>Standard</td><td>Little Dark</td><td>Dark</td></tr>
</table>
* You can set either one of the Memory switches 0 through 3; the default is “1”.</td></tr>
<tr><td>254</td><td>Gamma Curve Black Level (Photo, Doto photo ON)
<table>
<tr><td>Memory SW</td><td>0</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Print Image</td><td>Light</td><td>Standard</td><td>Little Dark</td><td>Dark</td></tr>
</table>
* You can set either one of the Memory switches 0 through 3; the default is “1”.</td></tr>
<tr><td>255</td><td>Gamma Curve White Level (Duo, Doto photo OFF)
<table>
<tr><td>Memory SW</td><td>0</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Print Image</td><td>Light</td><td>Standard</td><td>Little Dark</td><td>Dark</td></tr>
</table>
* You can set either one of the Memory switches 0 through 3; the default is “1”.</td></tr>
<tr><td>256</td><td>Gamma Curve Black Level (Duo, Doto Photo OFF)
<table>
<tr><td>Memory SW</td><td>0</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Print Image</td><td>Light</td><td>Standard</td><td>Little Dark</td><td>Dark</td></tr>
</table>
* You can set either one of the Memory switches 0 through 3; the default is “1”.</td></tr>
<tr><td>257</td><td>Gamma Curve White Level (Duo, Doto Photo ON)
<table>
<tr><td>Memory SW</td><td>0</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Print Image</td><td>Light</td><td>Standard</td><td>Little Dark</td><td>Dark</td></tr>
</table>
* You can set either one of the Memory switches 0 through 3; the default is “1”.</td></tr>
<tr><td>258</td><td>Gamma Curve Black Level (Duo, Doto photo ON)
<table>
<tr><td>Memory SW</td><td>0</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Print Image</td><td>Light</td><td>Standard</td><td>Little Dark</td><td>Dark</td></tr>
</table>
* You can set either one of the Memory switches 0 through 3; the default is “1”.</td></tr>
</table>

<table>
<tr><th>No.</th><th>DETAILS OF MEMORY SW</th></tr>
<tr><td>259</td><td>Slice Level Adjustment (Line-copy Mode)
<table>
<tr><td>Memory SW</td><td>8</td><td>9</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>Slice Level</td><td colspan="16">Low ◄——— Standard ———► High</td></tr>
</table>
Dark ◄——— Density ———► Light</td></tr>
<tr><td>260</td><td>Slice Level Adjustment (Automatic Scanning Contrast Control)
<table>
<tr><td>Memory SW</td><td>8</td><td>9</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>Slice Level</td><td colspan="16">Low ◄——— Standard ———► High</td></tr>
</table>
Dark ◄——— Density ———► Light</td></tr>
<tr><td>261</td><td>Fine Enhancement Setting
<table>
<tr><td>Memory SW</td><td>0</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Fine Enhancement</td><td>Low</td><td>Standard</td><td>Little High</td><td>High</td></tr>
</table>
* You can set either one of the Memory switches 0 through 3; the default is “1”.</td></tr>
</table>

MEMO

USER MODE

1. Operation Procedures

This mode allows the user to alter the initial settings of the machine.

[Starting Up Users Mode]

1) Press the [USER MODE] key on the sub-panel. The USER MODE setting screen will be displayed. When the [USER MODE] key is pressed, the “01 PRINT SPEED” setting screen is always displayed.

2) Using the [X] key or [+] key, change the item display to display the item you want to set. Now, pressing the [X] key decrements the item display(01 -> 19 -> 18 ->, ...) and pressing [+] key increments it(01 -> 02 -> 03 ->, ...).
3) In each setting screen, press the <START> key to select a choice. The selected item is displayed in reverse video. The reverse video is shifted from left to right by pressing the <START> key.
4) When setting multiple user modes at the same time, change the setting item, press the [X] key or [+] key to select the item you want to set, and make setting at the same time.
5) After altering all the user mode settings, press the <ALL RESET> key for one second. This will store all the items, exit the setting screen, and return to the normal screen display.

Note: The altered data remains valid until it is re-set again. If Test Mode No. 98 Memory Clear is executed, it will be initialized.

2. Initial Operation Settings

	Setting Item	Choice (–: Default)	Remarks
01	PRINT SPEED	1/ 2/ 3/ 4/ 5/ [#]	Sets the print speed at power-on or All reset.
02	Auto Print Feature	OFF/ ON/ [#]	Sets the Auto print feature at power-on or All reset.
03	Scanning Contrast	AUTO/ 3/ 4/ 5/ [#]	Sets the scanning density at power-on or All reset.
04	Paper Feed Mode	STANDARD/ CARD/ THIN / CUSTOM switch).	Sets an adequate paper feed timing for the paper used(adjust with each Memory
05	Auto Power-OFF Time	NONE/ 5 MiN/ 10 MIN/ 30 MIN	Sets the time required to automatically turn off the power when the printer is not used.
06	Auto Idle Period	12HRS/ 6HRS/ OFF	Sets the time required to turn on auto idling after last printing.
07	Auto Document Feed	OFF/ ON	Makes the next master automatically if the ADF original tray has the original after printing. The print count complies with that for the 1st original.
08	Image Processing	LINE/ DUO/ PHOTO/ [#]	Sets the Image processing mode at power-on or All reset.
09	Minimum Print Quantity	0/ 10/ 20/ 30	Disables master-making unless the print counter's value is higher than the set value.
10	Displayed Print Quantity	0000/ 0001	Sets the print count at power-on or All reset.
11	Auto Print-Q'ty Recovery	ON/ OFF	Resets the print count when you stop continuous printing with the STOP key to change to the master-making mode.
13	Multi-up Stage Interval	NONE/ 15 SEC.	Sets the waiting time required to start the next original after making the master for first original.
14	Auto Multi-Up Recovery	ON /OFF	Turns off the Multi-Up mode automatically after setting the Multi-Up mode to make the master.
15	Master-Making Area Limit	VARIABLE/ A3 / B4/A4 size or to the fixed size.	Selects whether the master should be cut automatically according to the print paper
16	Ejection Guide Arranging	AUTO/ A3/ B5/ CARD	Selects whether the jump wing should be operated automatically according to the paper width or in a stationary manner.
18	Job Separator Connection	NO / YES	Selects this when the Job Separator is used.
19	Displayed Language	#1 #2 #3 #4 #5 #6 #7 #8 #9 (NOTE 2)	Sets the language displayed on the LCD. (The available language differs depending on the panel ROM)

Note 1: [#] means to start at the value set at power-off.
Note 2: The language assigned to each number differs depending on the type of the panel ROM.

AVAILABLE LANGUAGE BY DESTINATIONS

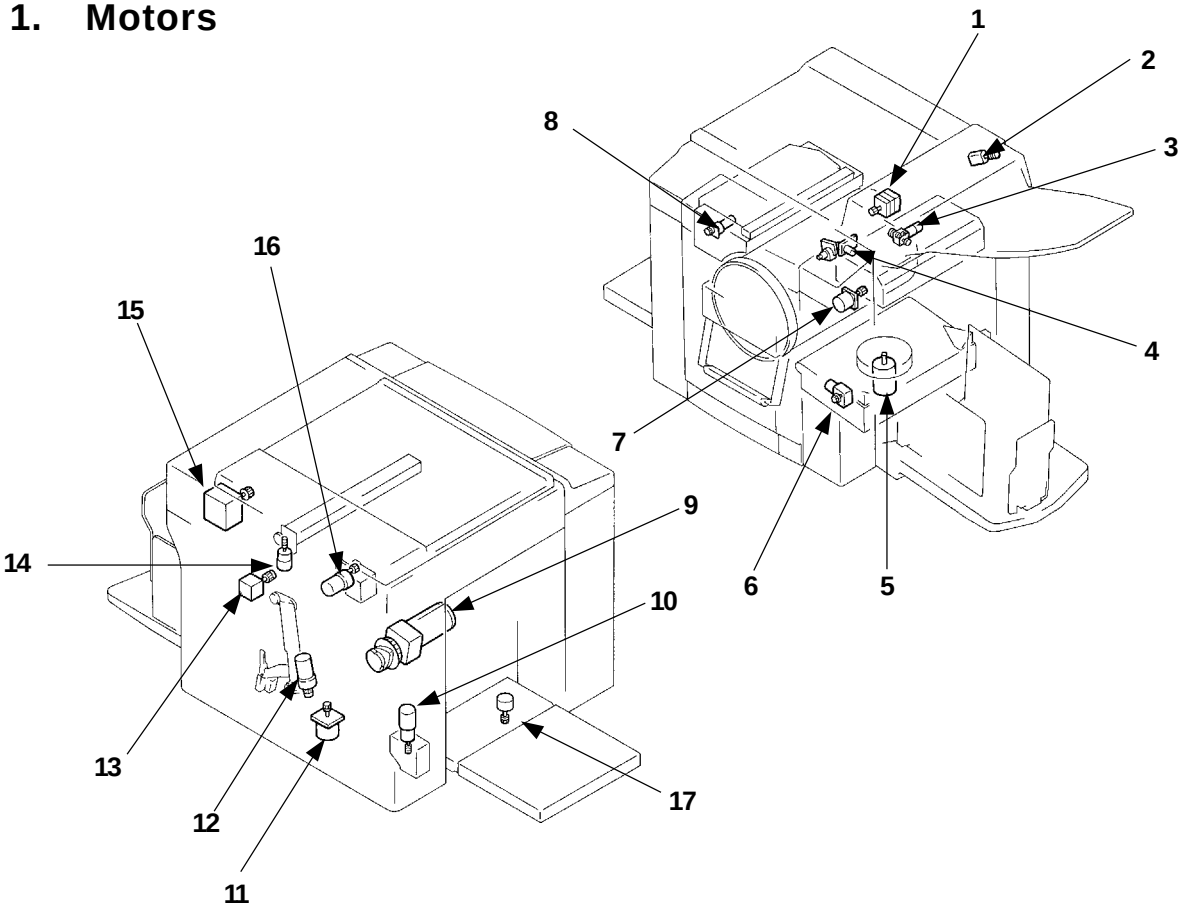
Destination	U.S.	Europe	Europe 2(Available for Service)	Asia
ROM	FRPU/ FRDU	FRPE/FRDE	FRPN/ FRDN	FRPA/ FRDA
#1	American English	British English	British English	British English
#2	French	American English	Swedish	Chinese (Standard)
#3	Korean	French	Norwegian	French
#4	German	German	German	Hindu
#5	Japanese	Japanese	Japanese	Japanese
#6	British English	Italian	Greek	Korean
#7	Spanish	Spanish	Danish	Taiwanese
#8	Portuguese	Portuguese	Finish	Indonesian
#9	Chinese (Standard)	Dutch	Polish	Thai

CHAPTER 23: ELECTRICAL COMPONENTS

Contents

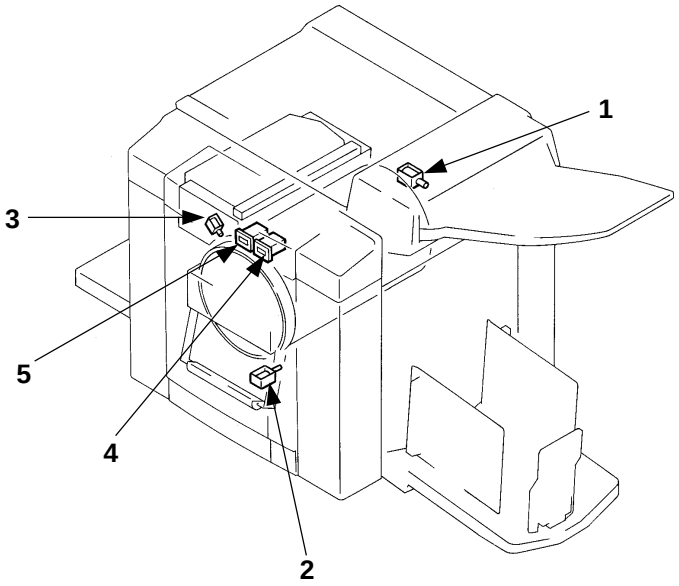
1. Motors 23-1
2. Solenoids & Clutches 23-2
3. Fan 23-3
4. Sensors 23-4
5. Switches 23-6
6. Other 23-8

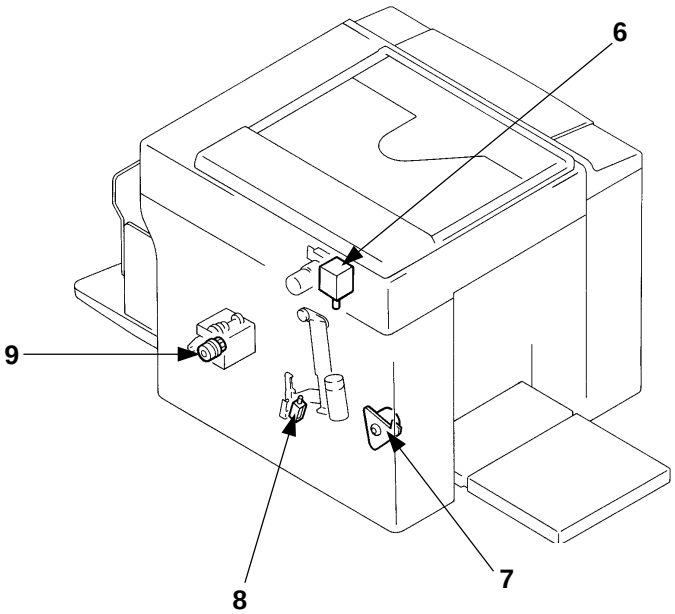
1. Motors



No.	Motors	Function	Test Mode No.
1	ADF read pulse motor	Runs the ADF transfer roller, white roller, and ADF exit roller. (Feeds the original)	113
2	Original pickup motor	Runs the ADF pickup roller and ADF stripper roller. (Feeds the original)	78, 113
3	Thermal pressure motor	Elevates the Thermal print head.	111
4	Inking motor	Activates the ink pump.(Supplies the ink)	101
5	Suction fan motor	Runs the suction fan.	69
6	Wing motor.	Elevates the jump wing, etc.	80
7	Write pulse motor	Runs the Write roller.(Feeds the master)	65
8	Master removal vertical transport motor	Runs the master removal vertical transport roller.	71
9	Main motor	Runs the drive unit.	60, 61 62
10	Elevator motor	Elevates the paper feed tray.	102
11	Print positioning motor	Elevates the slide plate.(Adjusts the vertical print position)	
12	Pressure control motor	Controls the pressure of Pressure roller.	
13	Loading pulse motor	Runs the load roller.(Feeds the master)	66
14	Cutter motor	Runs the cutter.(Cuts the master)	112
15	Flat bed read pulse motor	Moves the image scanner.	108
16	Clamp motor	Opens/closes the clamp plate.	104
17	Paper feed tray slide motor (A3 machine)	Moves the paper feed tray to left/right.	103

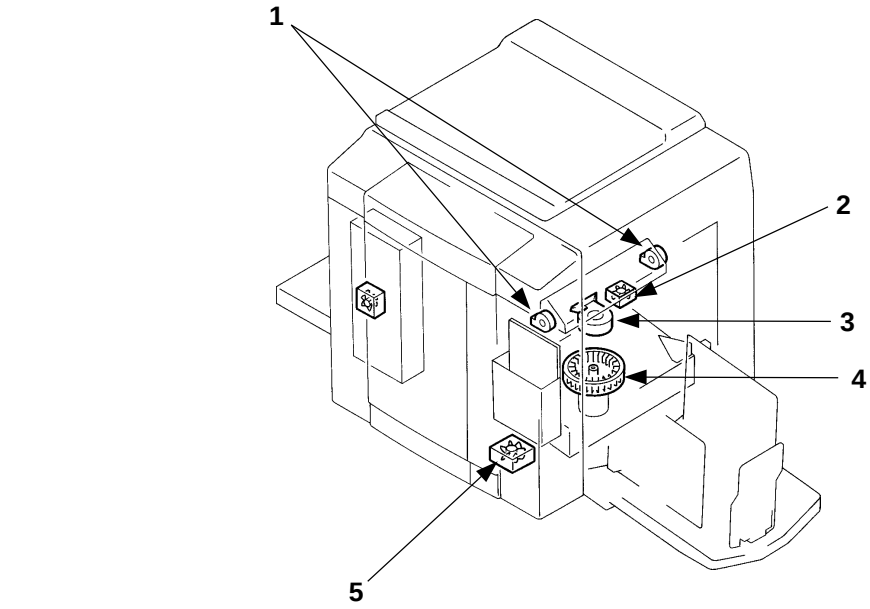
2. Solenoids & Clutches

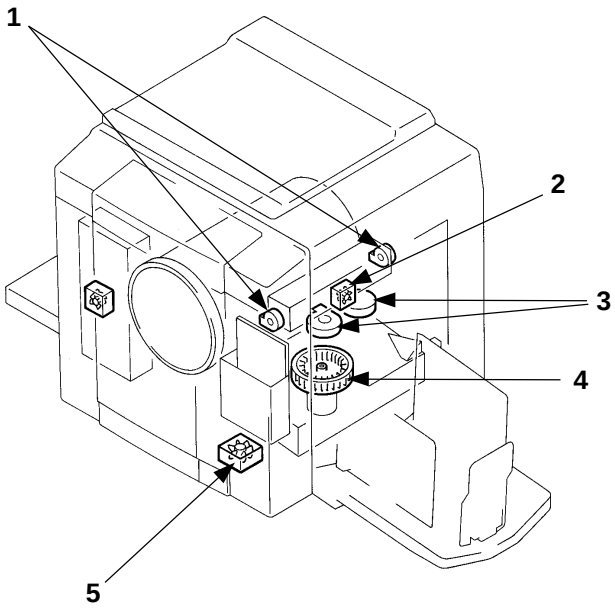




No.	Part Name	Function	Test Mode No.
1	Original pickup solenoid	Elevates the ADF pickup arm.	76
2	Lock solenoid	Locks/unlocks the drum rail.	74
3	Master removal solenoid	Puts in/out the master removal hook.	71
4	Master counter	Counts the masters.	
5	Copy counter	Counts the printed sheets.	
6	Clamp solenoid	Elevates the clamp unit.	73
7	Paper feed clutch	Runs the scraper and pickup roller.(Feeds the paper)	67
8	Pressure solenoid	Activates the hook.(Moves up the pressure roller).	68
9	Suction clutch	Changes the transfer belt's speed.	131

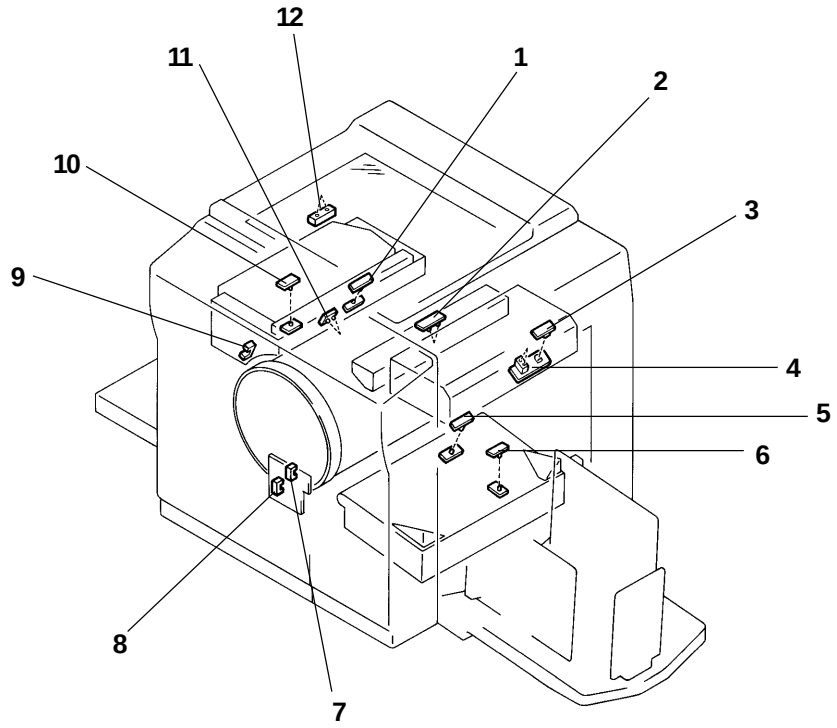
3. Fan





No.	Fan	Function	Test Mode No.
1	Master removal fan	Controls the end of the master.	70
2	Loading fan	Prevents creases when loading the master.	72
3	Separation fan	Separates the paper from the drum.	64
4	Suction fan	Adsorbes the paper to the transfer belt.	69
5	Power supply cooling fan	Cools the power supply unit.	

4. Sensors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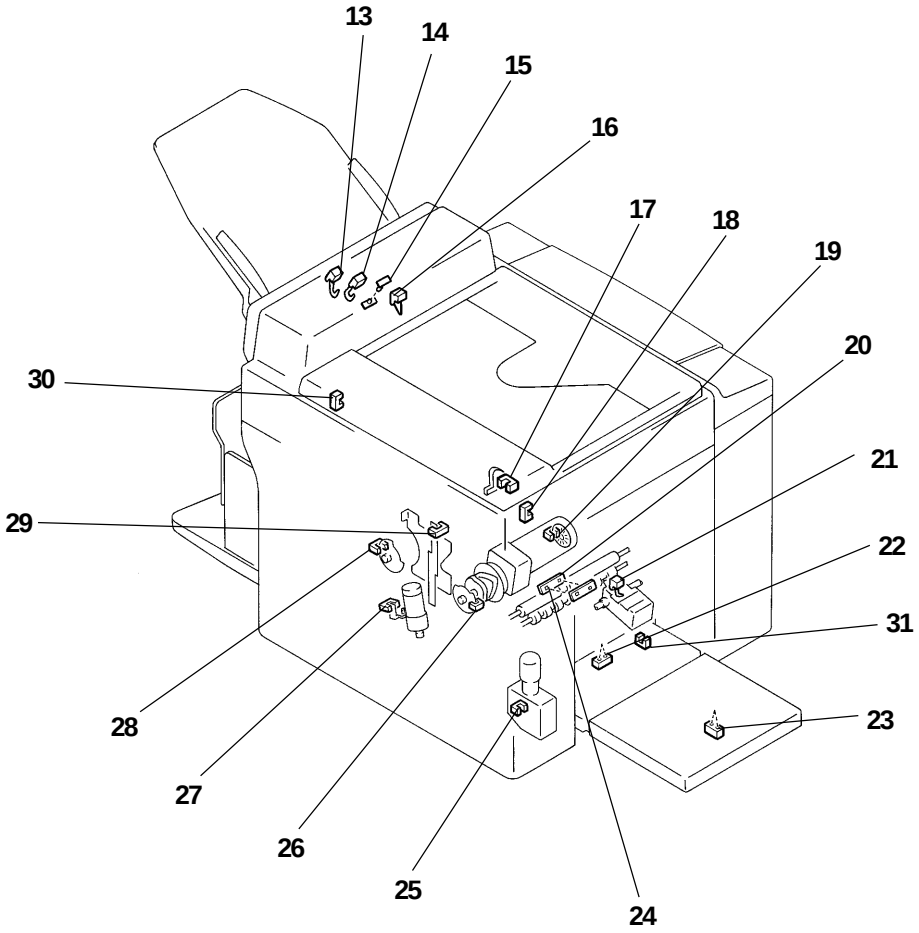
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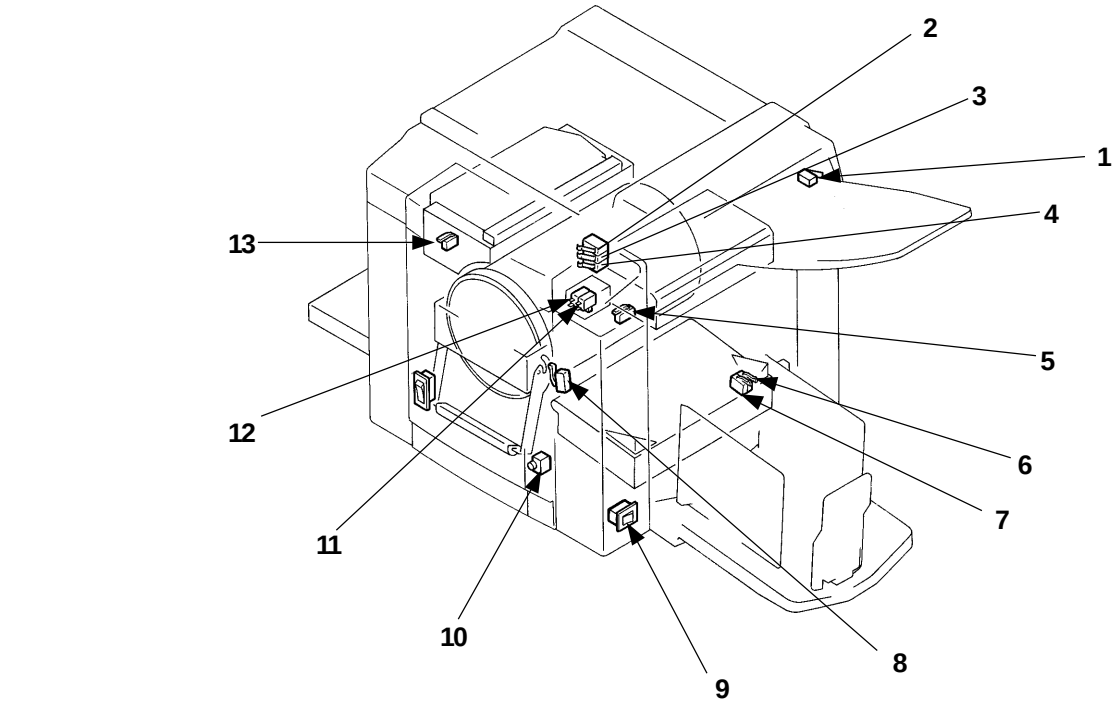
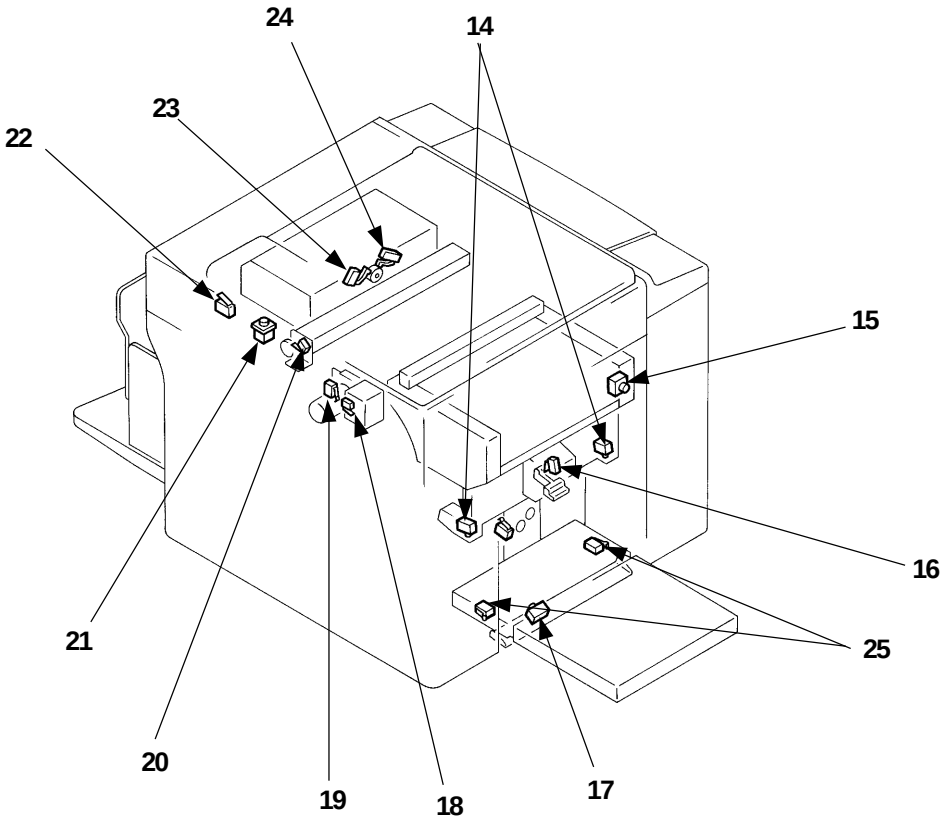
No.	Sensor	Type	Function	Test Mode No.
1	Master removal sensor	Transparent	Checks master removal jam.	28
2	Master positioning sensor	Reflection	Checks positioning of the master.	15
3	Master end sensor	Transparent	Checks the end of the master roller.	23
4	Master detection sensor	Reflection	Checks setting of the master roller.	47
5	Paper receiving sensor 1	Transparent	Checks paper jam.	19
6	Paper receiving sensor 2	Transparent	Checks paper jam.	20
7	Position C sensor	Interrupt	Checks the drum rotating position.	11
8	Position A sensor	Interrupt	Checks the drum rotating position.	8
9	Master removal hook sensor	Interrupt	Checks the master removal hook position.	14
10	Disposal box master sensor (Master removal sensor)	Transparent	Checks inside the master disposal box.	54
11	Master loading sensor	Reflection	Checks the master presence on the drum.	48
12	FB original detection sensor	Reflection	Checks the original on the stage glass.	52
13	ADF original detection sensor	Actuator	Checks setting of the ADF original.	34
14	Original registration sensor	Actuator	Checks feed of the original.	35
15	Original IN sensor	Transparent	Checks feed of the original.	36
16	Original OUT sensor	Actuator	Checks feed of the original.	45
17	Stage cover sensor	Interrupt	Check closing of the stage cover.	51
18	Scanner home position sensor	Interrupt	Check the position of the image scanner.	49
19	Main motor encoder sensor	Interrupt	Checks the main motor's rpm.	
20	Paper feed det sensor (Slack sensor)	Transparent	Checks first paper feed.	25
21	Elevator upper-limit sensor	Actuator	Checks the upper-limit position of the paper feed tray.	
22	Paper detection sensor	Reflection	Checks the paper on the paper feed tray.	55
23	Paper size sensor	Reflection	Checks the length of the print paper.	2
24	Paper sensor	Transparent	Checks second paper feed.	6
25	Elevator lower-limit sensor	Interrupt	Checks the lower-limit position of the paper feed tray.	3
26	Paper feed clutch sensor	Interrupt	Checks the paper feed clutch ON timing.	24
27	Pressure control sensor	Interrupt	Checks the pressure initial position.	53
28	Pressure detection sensor	Interrupt	Checks the drum rotating position.	7
29	Vertical centering sensor	Interrupt	Checks the vertical center position.	22
30	ADF shading sensor	Interrupt	Checks the image scanner position.	50
31	Paper feed tray position sensor (A3 machine)	Interrupt	Checks the center position of the paper feed tray.	56

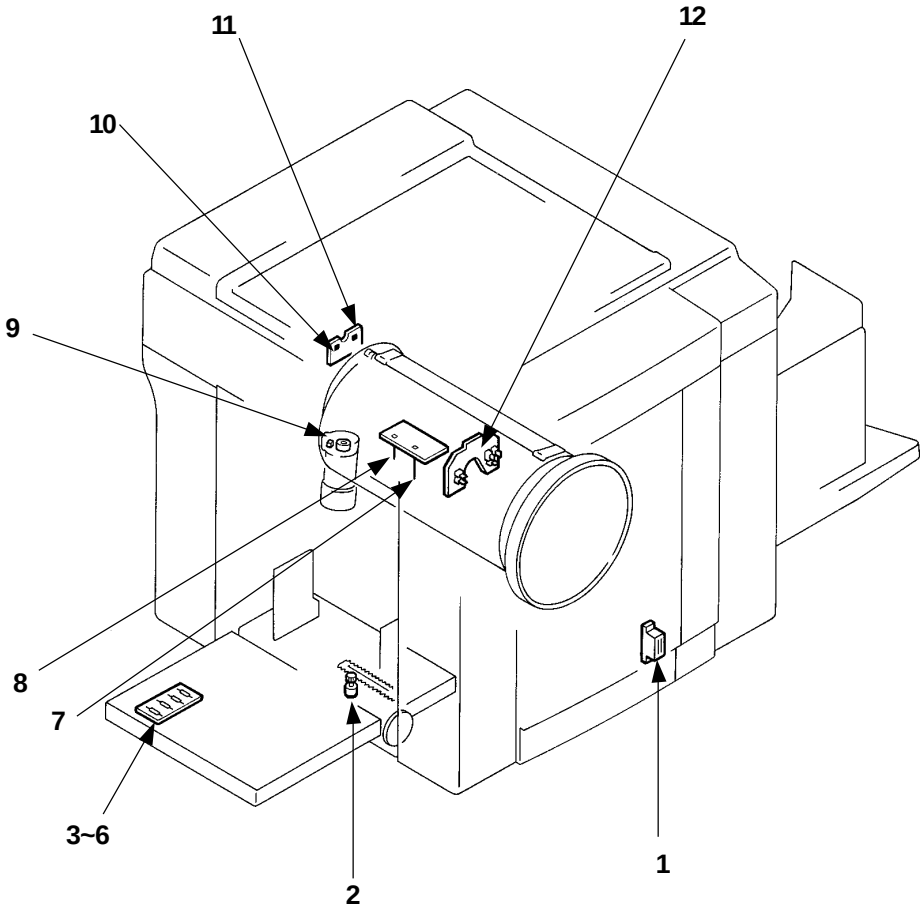
5. Switches





No.	Switch	Function	Test Mode No.
1	ADF switch	Checks setting of the ADF cover.	46
2	Ink bottle set switch 3 (Color drum)	Checks setting of the ink bottle.	125
3	Ink bottle set switch 2 (Color drum)	Checks setting of the ink bottle.	125
4	Ink bottle set switch 1 (Color drum)	Checks setting of the ink bottle.	125
5	Master loading unit switch	Checks setting of the Master loading unit.	29
6	Jump wing switch 1	Checks the position of the jump wing, etc.	26
7	Jump wing switch 2	Checks the position of the jump wing, etc.	27
8	Drum set switch	Checks setting of the drum.	18
9	Power switch	Turns on/off the main power.	
10	Drum home position button	Sets the drum to the position A.	16
11	Main motor interlock switch	Forcibly turns off the main motor.	39
12	Thermal power interlock switch	Forcibly turns off the thermal power.	
13	Disposal box set switch	Check setting of the master disposal box.	33
14	Paper feed safety switch (Upper)	Checks safety of the paper feed tray. (Forcibly turns off the elevator motor)	40
15	Feed tray down button	Manually moves down the paper feed tray.	12
16	Paper feed pressure switch	Checks the position of the paper feed pressure adjustment lever.	4
17	Paper feed safety switch (Lower)	Checks safety of the paper feed tray. (Forcibly turns off the elevator motor)	40
18	Range set switch	Changes a clamp solenoid current value.	
19	Clamp safety switch	Checks the clamp unit position.	13
20	Cutter position switch	Checks the position of the cutter upper blade.	
21	Master loading button	Manually cuts the master.	5
22	Scanner table set switch	Checks setting of the scanner table.	21
23	TPH pressure switch	Check descent of the thermal print head.	32
24	TPH home position switch	Checks ascent of the thermal print head.	31
25	Paper feed tray safety switch (A3 machine)	Forcibly turns off the paper feed tray slide motor.	

6. Other



No.	Part Name	Type	Function	Test Mode No.
1	Front cover set switch	Magnetic lead	Checks setting of the front cover.	30
2	Paper size potentiometer (Paper size VR)	VR	Checks the print paper size.	222
3	Paper feed cassette sensor 1	Magnetic lead switch	Checks the paper feed cassette.	41
4	Paper feed cassette sensor 2	Magnetic lead switch	Checks the paper feed cassette.	42
5	Paper feed cassette sensor 3	Magnetic lead switch	Checks the paper feed cassette.	43
6	Paper feed cassette sensor 4	Magnetic lead switch	Checks the paper feed cassette.	44
7	Ink sensor	Electrostatic capacity	Checks the ink.	37
8	Overflow sensor	Electrostatic capacity	Checks the ink for overflow.	38
9	Pressure encoder sensor	Hall IC	Checks the pressure control motor for run.	
10	0°Angular sensor	Hall IC	Checks the clamp plate position.	9
11	180°Angular sensor	Hall IC	Checks the clamp plate position.	10
12	Bottle set switch (Black drum)		Checks setting of the ink bottle.	125

CHAPTER 24: DESCRIPTION OF PCBs

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FR3950α only

13. SC Main PCB — 24-50

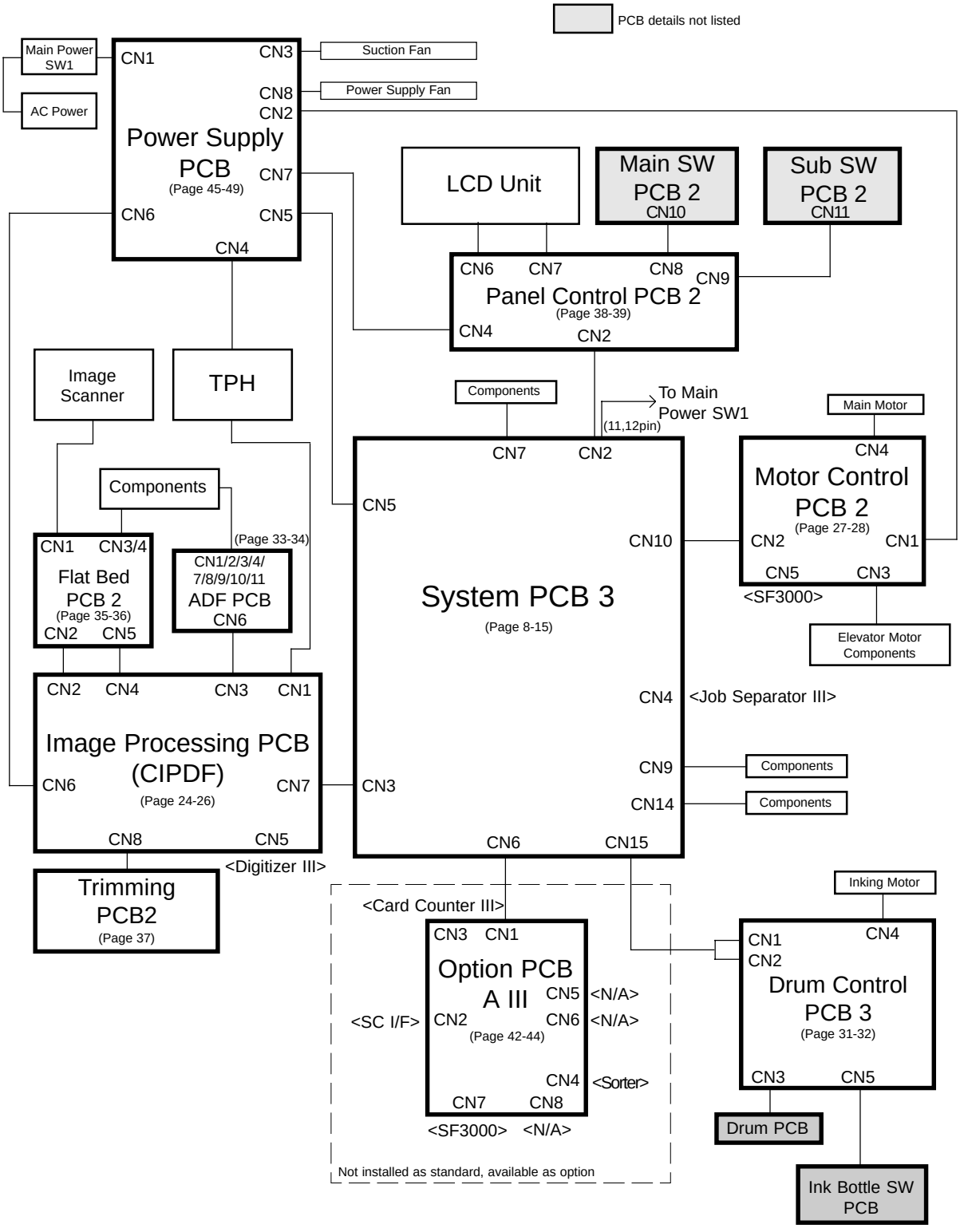
14. I/F Port PCB — 24-53

15. SC Power Supply PCB;SC3K — 24-55

1. BLOCK CHART(1/3)

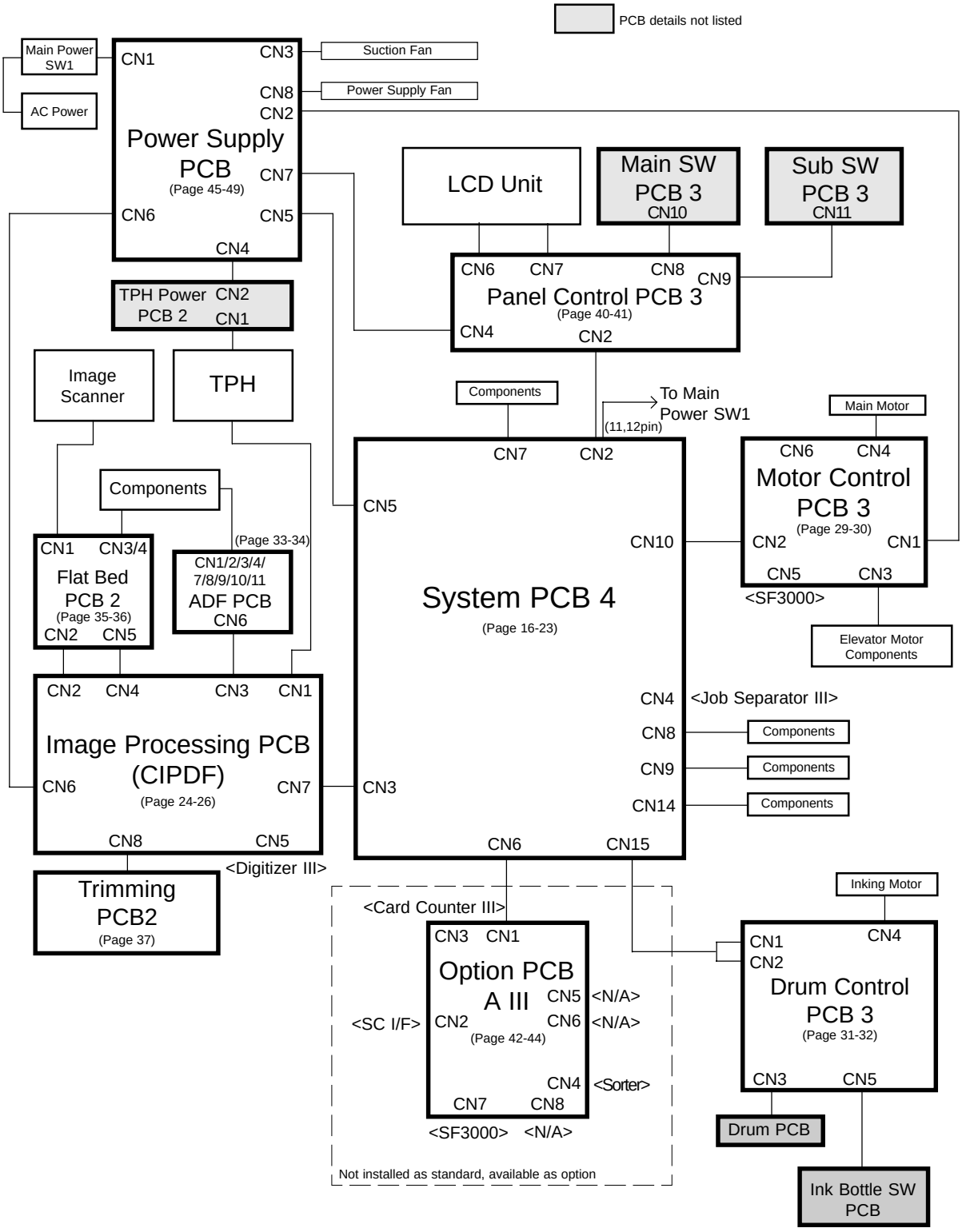
1. BLOCK CHART

1-1. FR2950



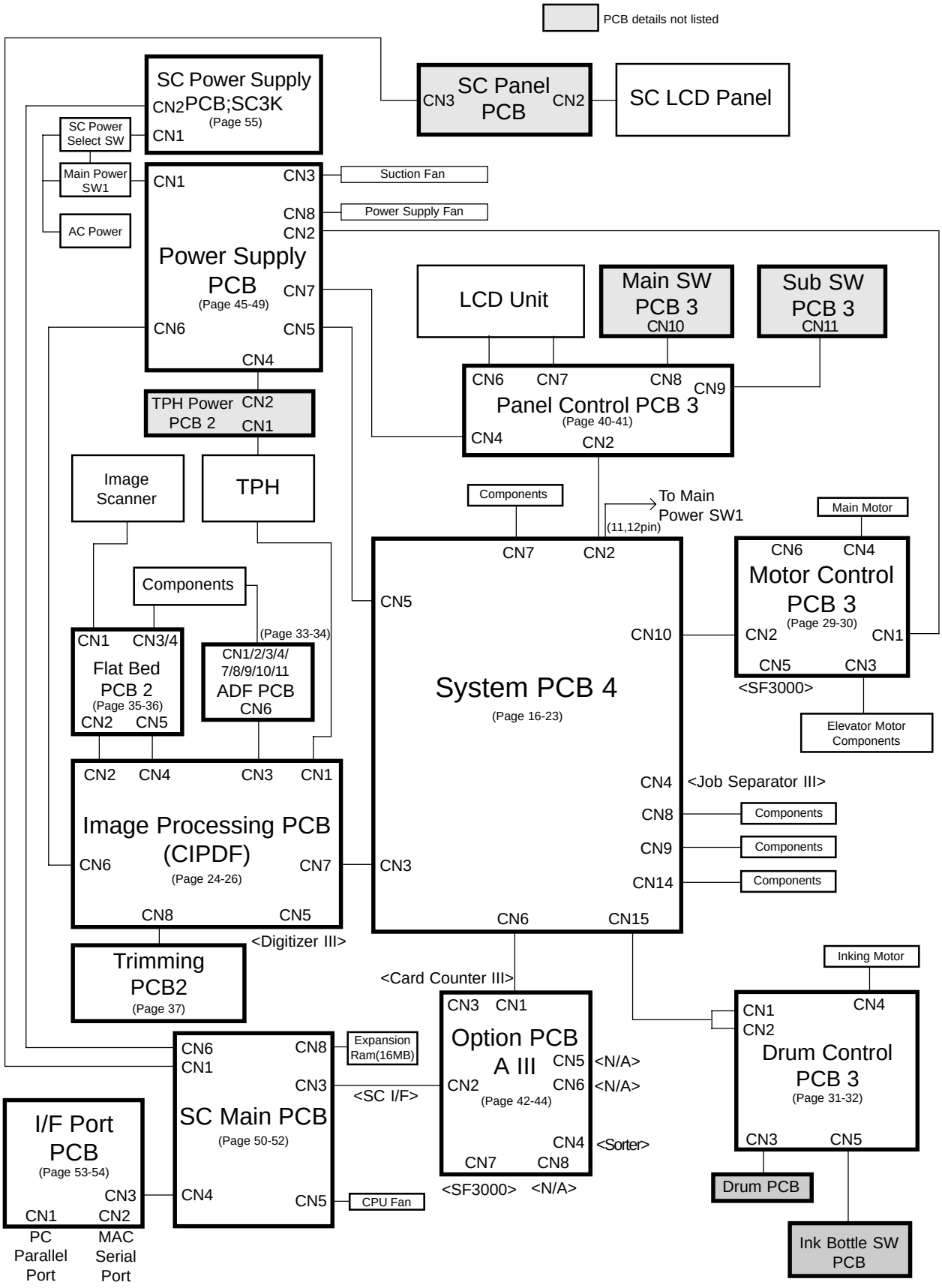
1. BLOCK CHART(2/3)

1-2. FR3950



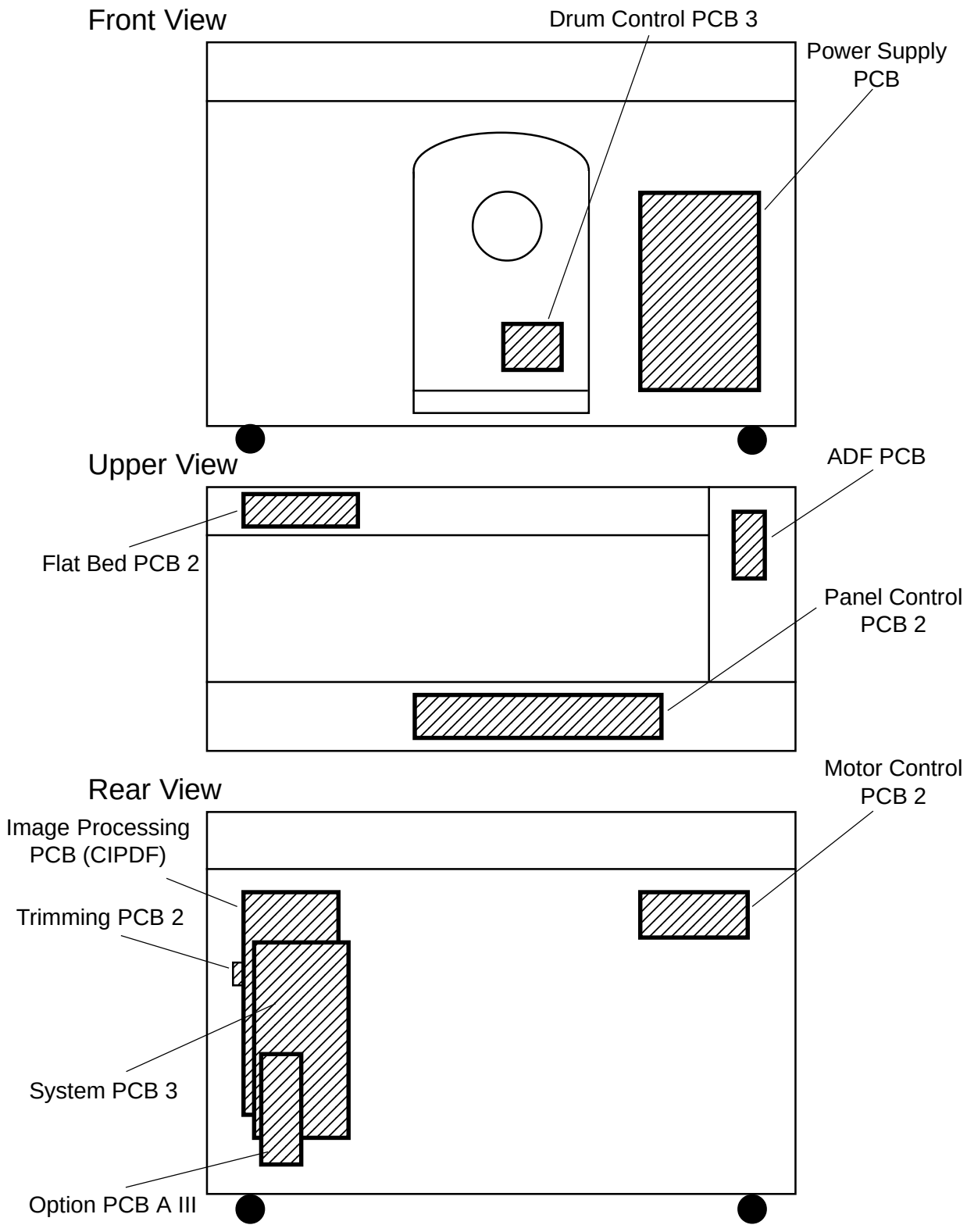
1. BLOCK CHART(3/3)

1-3. FR3950α



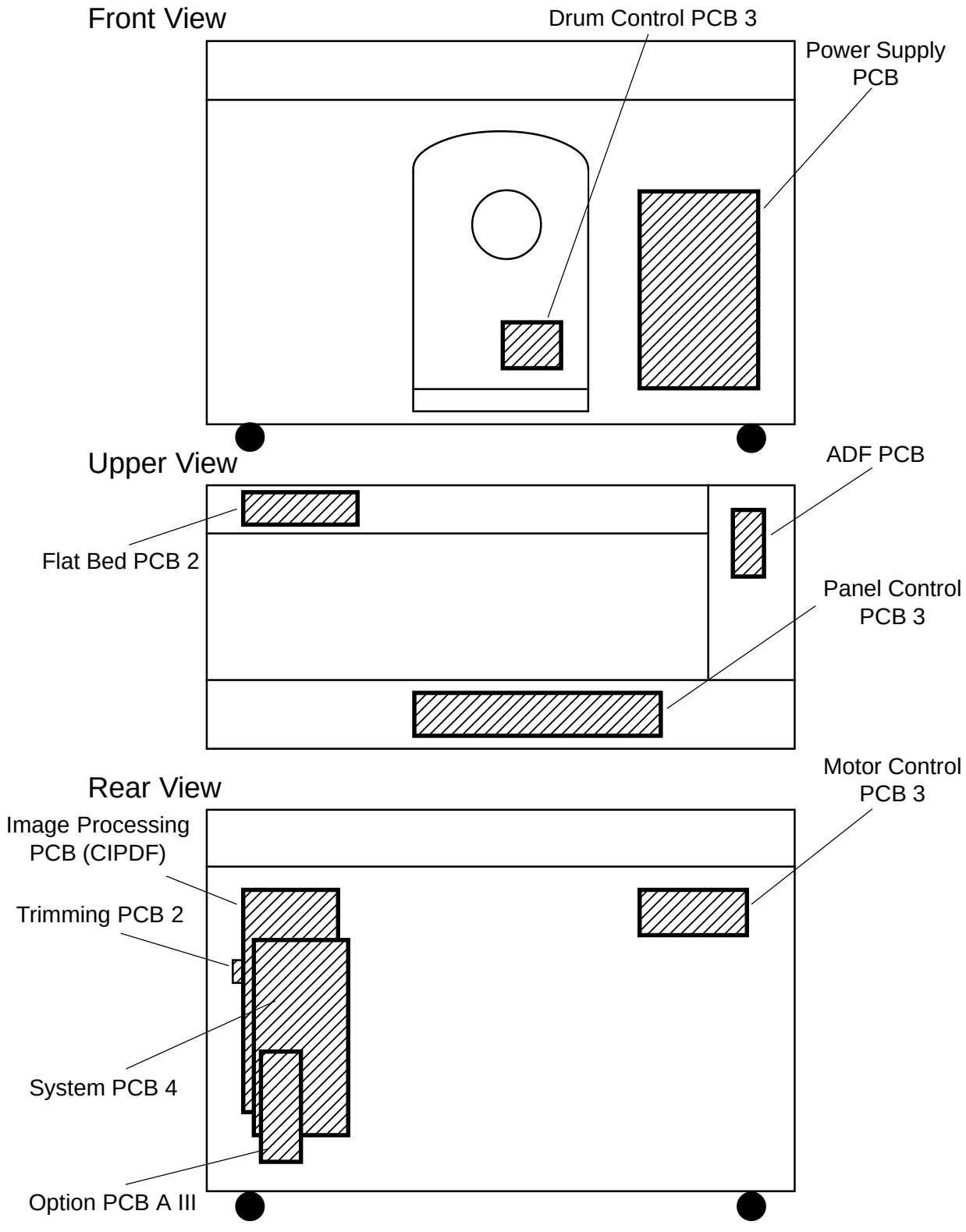
2. LOCATION OF PCBs

2-1. FR2950



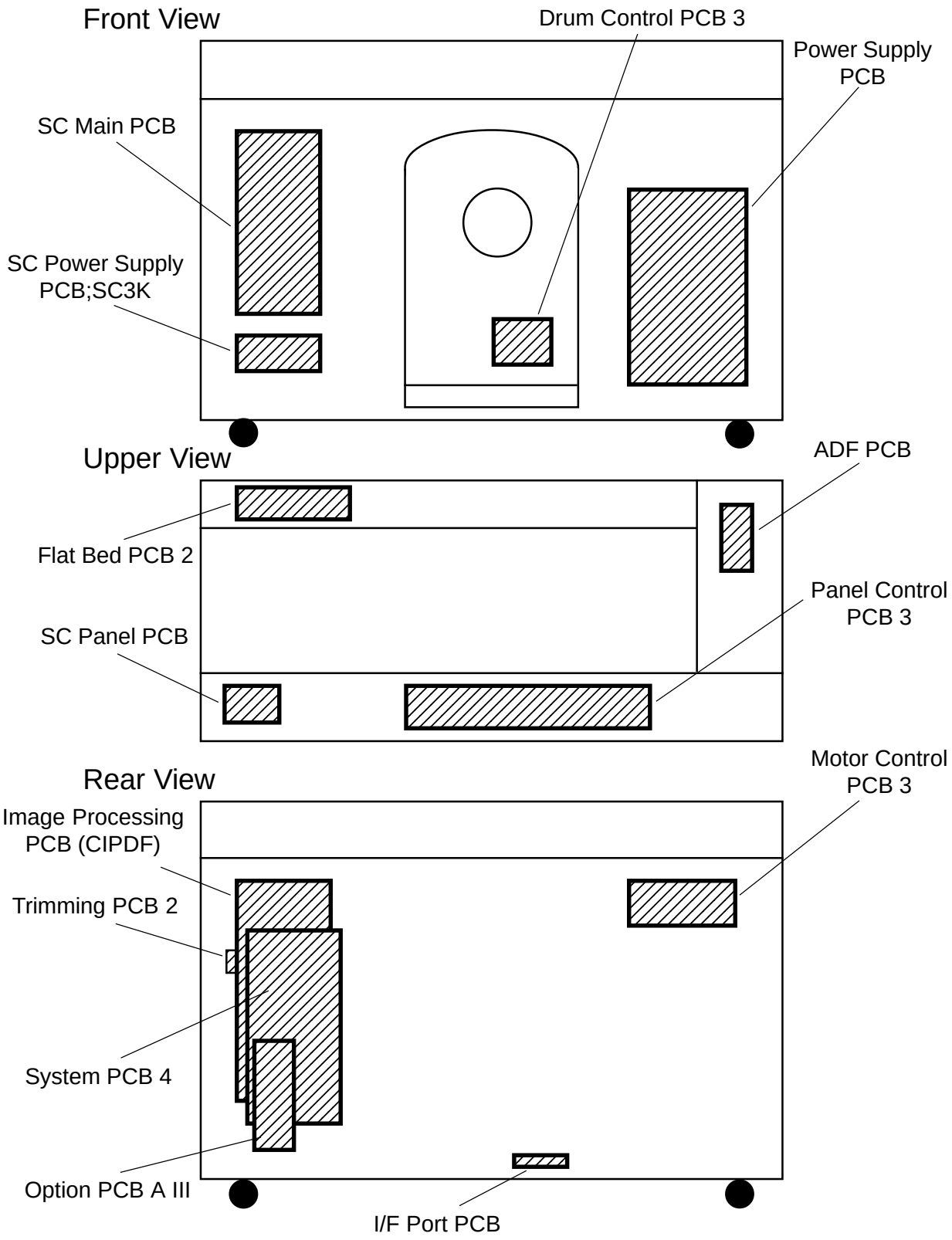
2. LOCATION OF PCBs(2/4)

2-2. FR3950



2. LOCATION OF PCBs(3/4)

2-3. FR3950α



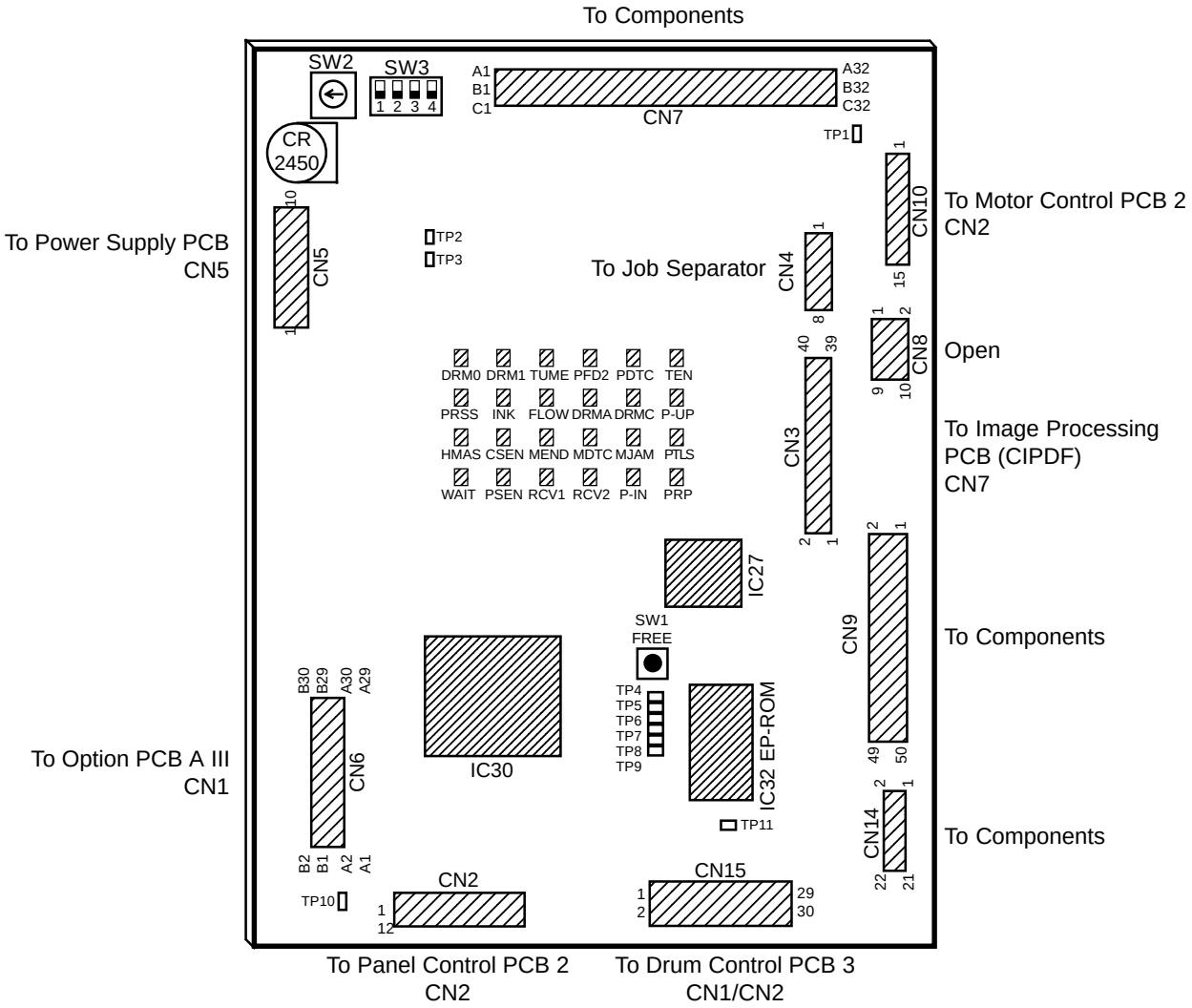
2. LOCATION OF PCBs(4/4)

2-4. PCB Function Detail

PCB Name	Function	Risograph Model
System PCB 3	Overall Control, Drive control of components	FR2950
System PCB 4	Overall Control, Drive control of components	FR3950/3950α
Image Processing PCB (CIPDF)	Processing Image data	FR2950/3950/3950α
Motor Control PCB 2	Control of Main Motor and Elevator Motor	FR2950
Motor Control PCB 3	Control of Main Motor and Elevator Motor	FR3950/3950α
Flat Bed PCB 2	Drive control of Read Pulse Motor, Junction of Sensors on Flat Bed PCB and ADF PCB	FR2950/3950/3950α
ADF PCB	Drive function of ADF unit	FR2950/3950/3950α
Panel Control PCB 2	Enter function key, Control display	FR2950
Panel Control PCB 3	Enter function key, Control display	FR3950/3950α
LCD Unit	Liquid Crystal Display (w/ Back Light)	FR2950/3950/3950α
Main SW PCB 2	Enter numeral key	FR2950
Main SW PCB 3	Enter numeral key	FR3950/3950α
Sub SW PCB 2	Enter Sub Panel function key	FR2950
Sub SW PCB 3	Enter Sub Panel function key	FR3950/3950α
Power Supply PCB (100 or 200)	Supply all voltages	FR2950/3950/3950α
TPH Power PCB 2	Supply voltage to TPH	FR3950/3950α
Drum Control PCB 3	Junction of sensors on Drum PCB, Drive Inking Motor	FR2950/3950/3950α
Trimming PCB2	Achieve image trimming function	FR2950/3950/3950α
Option PCB A III (Pre-installed on FR3950α, option for other models)	Control SC series Interface, Sorter, Card Counter,etc.	FR2950/3950/3950α
SC Main PCB	Control SC Computer Interface function	FR3950α
I/F Port PCB	Input port from PC or Mac (PC Parallel Port, MAC serial Port)	FR3950α
SC Power Supply PCB;SC3K	Supply voltage to SC Main PCB and CPU Fan	FR3950α
SC Panel PCB	Enter SC Panel function	FR3950α
SC LCD PCB	Display SC status	FR3950α

3. SYSTEM PCB

3-1. System PCB 3



SW

SW1 :Drum (Main motor) 30 rpm

SW2 :Machine Selection HEX SW
Please refer APPENDIX for the detail

SW3 :Machine Selection Dip SW
Please refer APPENDIX for the detail

LED

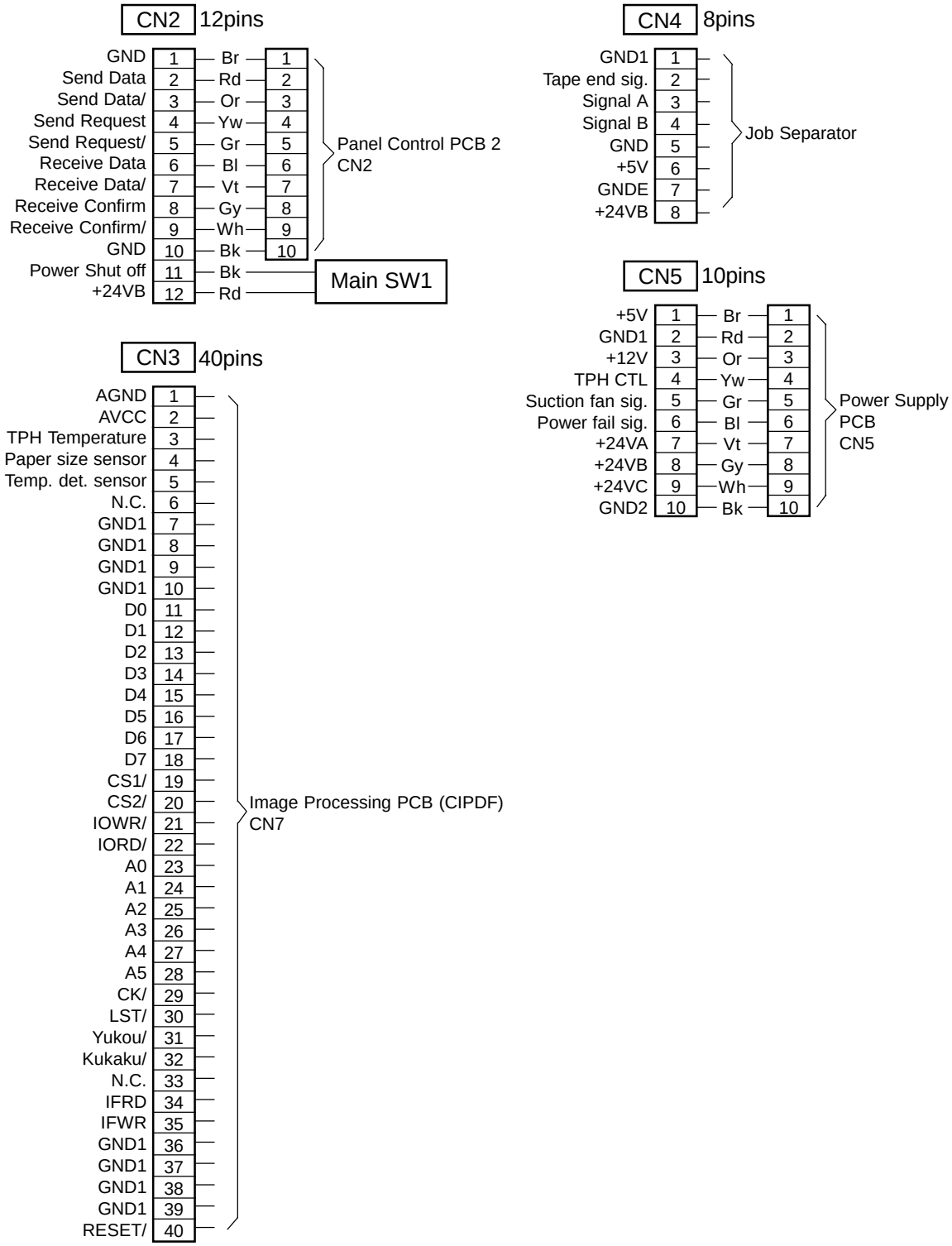
LED	Sensor Name	When LED is ON
DRM0	0 Angular Sensor	Magnetism is detected
DRM1	180 Angular Sensor	Magnetism is detected
PFD2	Paper Feed Clutch Sensor	Light path is blocked
PDTC	Paper Detection Sensor	Reflected light detected
TEN	Vertical Centering Sensor	Light path is blocked
PRSS	Pressure Detection Sensor	Light path is blocked
INK	Ink Sensor	Ink is not detected
FLOW	Overflow Sensor	Ink is not detected
DRMA	Position A Sensor	Light path is blocked
DRMC	Position C Sensor	Light path is blocked
P-UP	Elevator Upper Limit Sensor	Light path is opened (actuator pressed)
HMAS	Disposal Box Master Sensor	Light path is opened (Master not detected)
CSEN	Master Loading Sensor	Reflected light (Master) detected
MEND	Master END Sensor	Reflected light (Master) detected
MDTC	Master Detection Sensor	Reflected light (Master) not detected
MJAM	Master Removal Sensor	Light path is blocked (Master detected)
PTLS	Paper Size Detection Sensor	Reflected light (Paper) detected
WAIT	Master Positioning Sensor	Reflected light (Master) not detected
PSEN	Paper Sensor	Light path is blocked (Paper detected)
RCV1	Paper Receiving Sensor 1	Light path is blocked (Paper detected)
RCV2	Paper Receiving Sensor 2	Light path is blocked (Paper detected)
P-IN	Paper Feed Detection Sensor	Light path is blocked (Paper detected)
PRP	Pressure Control Sensor	Light path is opened
TUME	Master Removal Hook Sensor	Light path is opened

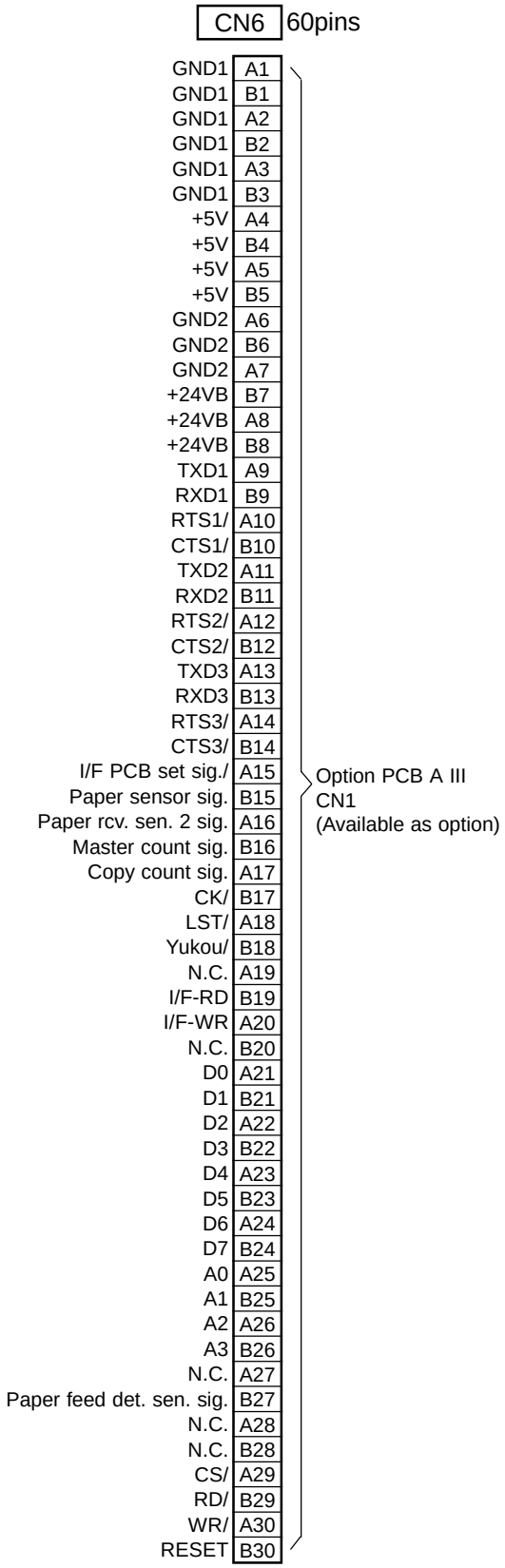
TP

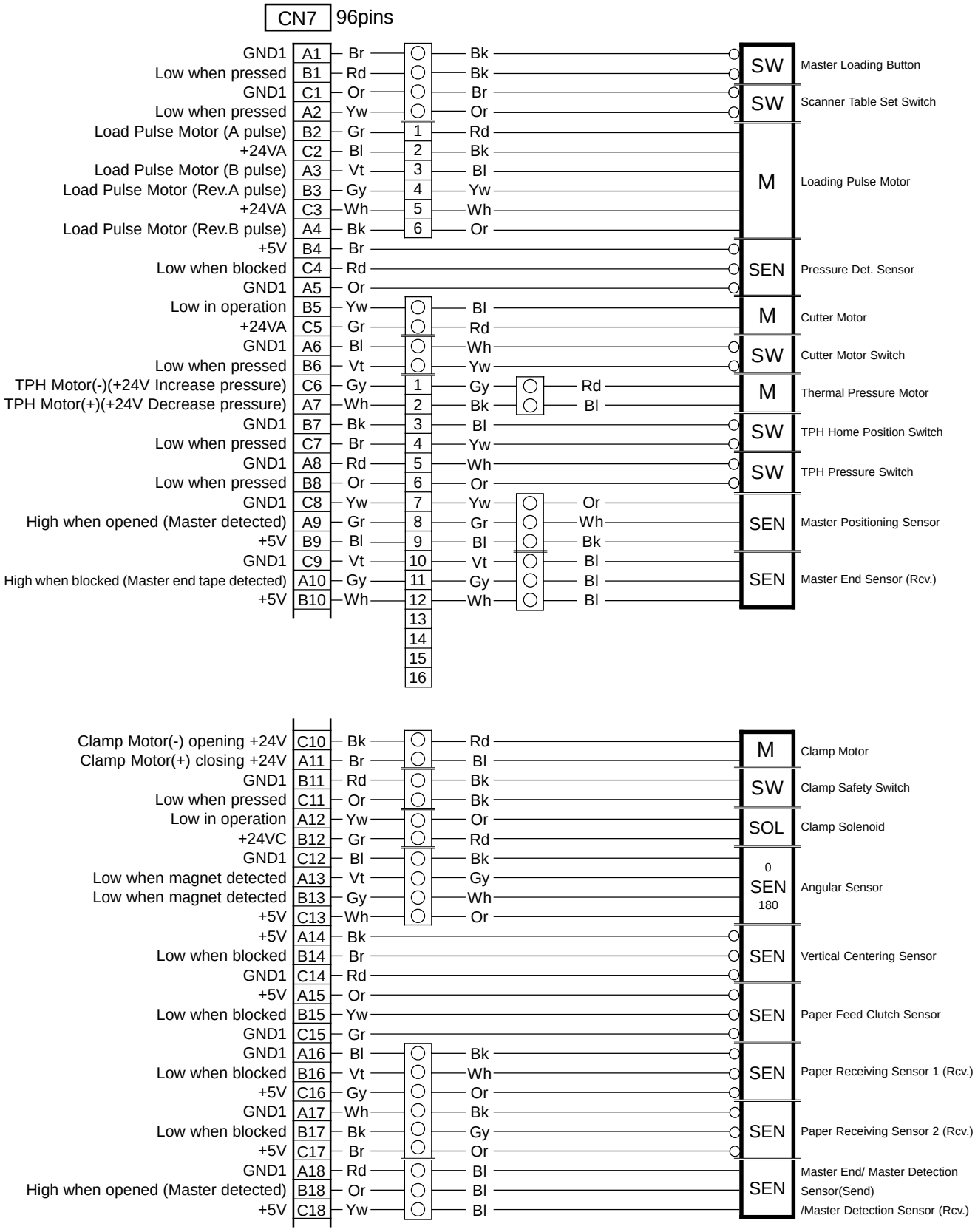
TP1 (GND)	Ground for +5V lines	TP7 (AKEN)	+5V
TP2 (GNDE)	Ground for +24V lines	TP8 (NMI)	+5V
TP3 (GND)	Ground for +5V lines	TP9 (RESET)	+5V
TP4 (PRESS)	+5V	TP10 (GND)	Ground for +5V lines
TP5 (PKEN)	+5V	TP11 (GND)	Ground for +5V lines
TP6 (CKEN)	+5V		

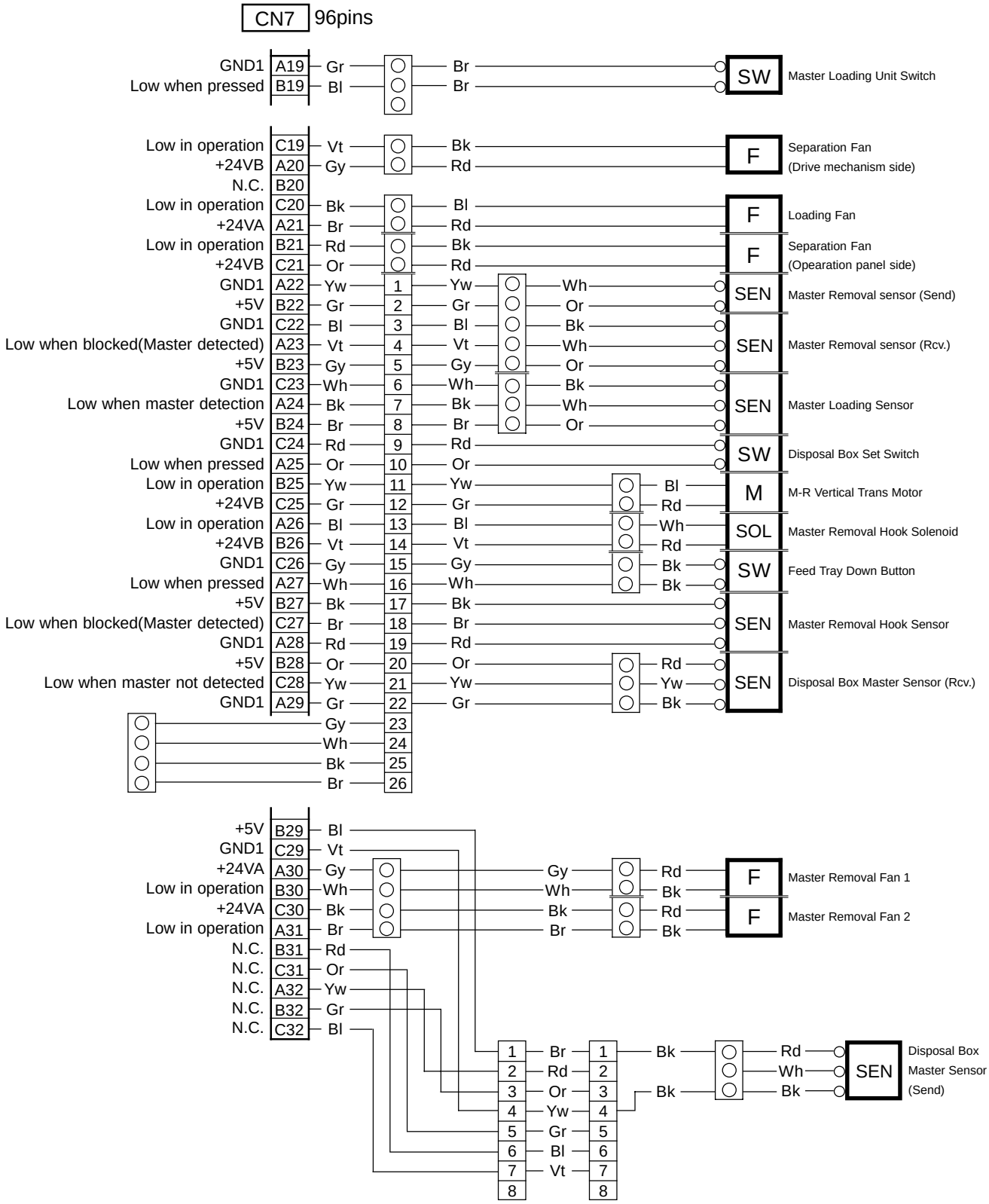
Battery

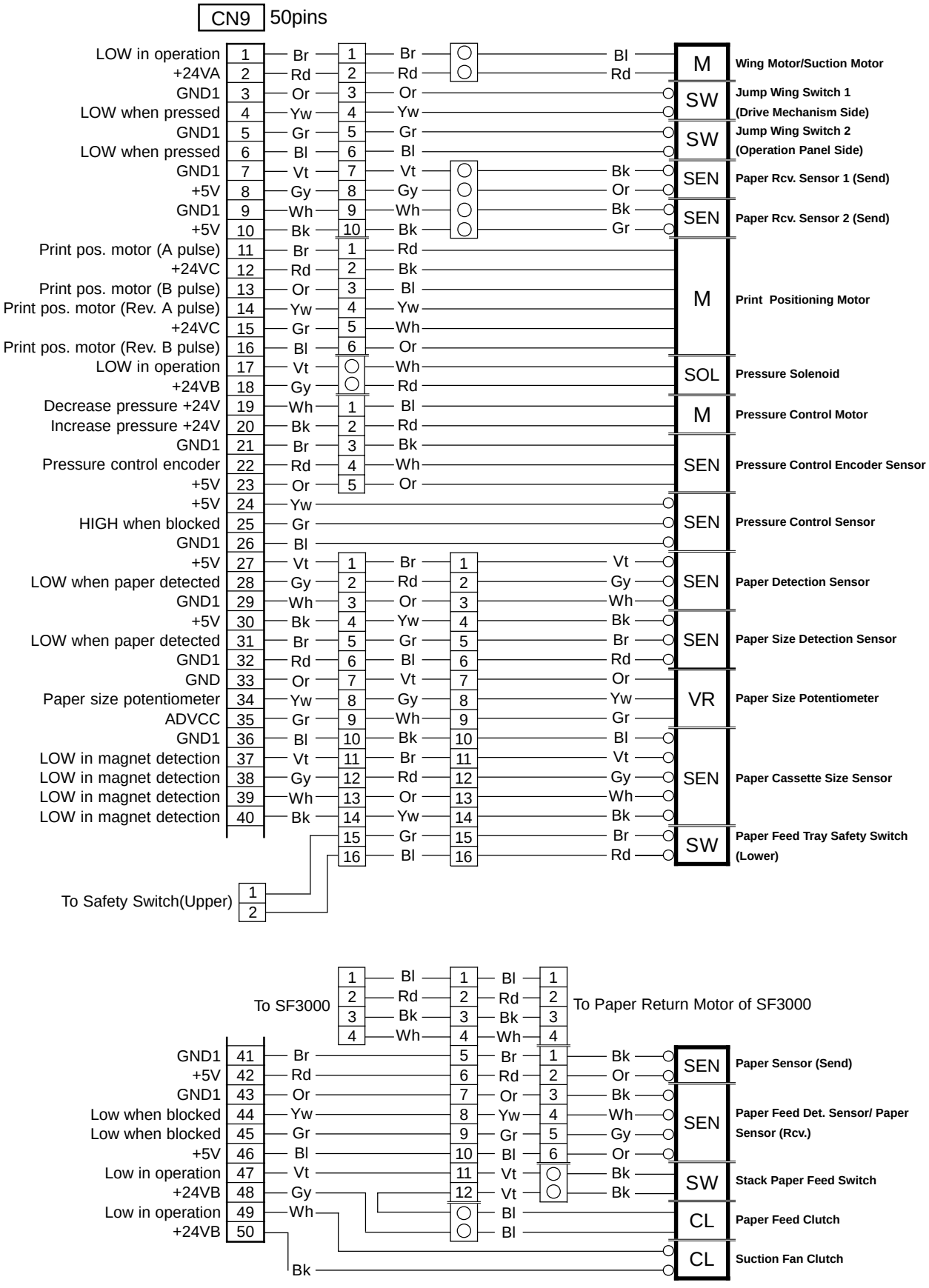
CR2450	1 piece

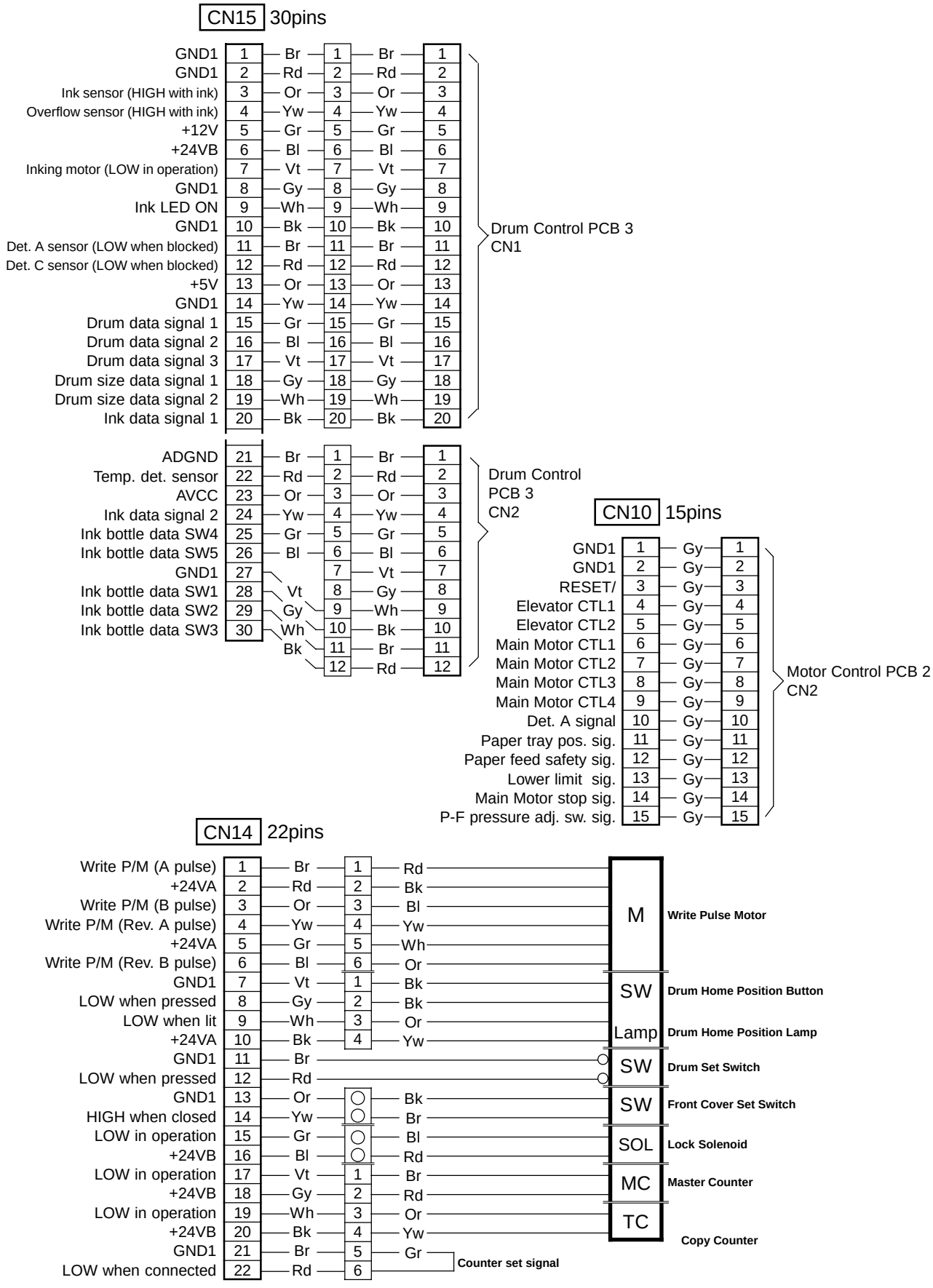

CN2 12pins
GND 1 Br 1
Send Data 2 Rd 2
Send Data/ 3 Or 3
Send Request 4 Yw 4
Send Request/ 5 Gr 5
Receive Data 6 Bl 6
Receive Data/ 7 Vt 7
Receive Confirm 8 Gy 8
Receive Confirm/ 9 Wh 9
GND 10 Bk 10
Panel Control PCB 2
CN2
Power Shut off 11 Bk
+24VB 12 Rd
Main SW1
CN4 8pins
GND1 1
Tape end sig. 2
Signal A 3
Signal B 4
GND 5
+5V 6
GNDE 7
+24VB 8
Job Separator
CN5 10pins
+5V 1 Br 1
GND1 2 Rd 2
+12V 3 Or 3
TPH CTL 4 Yw 4
Suction fan sig. 5 Gr 5
Power fail sig. 6 Bl 6
+24VA 7 Vt 7
+24VB 8 Gy 8
+24VC 9 Wh 9
GND2 10 Bk 10
Power Supply
PCB
CN5
CN3 40pins
AGND 1
AVCC 2
TPH Temperature 3
Paper size sensor 4
Temp. det. sensor 5
N.C. 6
GND1 7
GND1 8
GND1 9
GND1 10
D0 11
D1 12
D2 13
D3 14
D4 15
D5 16
D6 17
D7 18
CS1/ 19
CS2/ 20
IOWR/ 21
IORD/ 22
A0 23
A1 24
A2 25
A3 26
A4 27
A5 28
CK/ 29
LST/ 30
Yukou/ 31
Kukaku/ 32
N.C. 33
IFRD 34
IFWR 35
GND1 36
GND1 37
GND1 38
GND1 39
RESET/ 40
Image Processing PCB (CIPDF)
CN7


CN6
60pins
GND1 A1
GND1 B1
GND1 A2
GND1 B2
GND1 A3
GND1 B3
+5V A4
+5V B4
+5V A5
+5V B5
GND2 A6
GND2 B6
GND2 A7
+24VB B7
+24VB A8
+24VB B8
TXD1 A9
RXD1 B9
RTS1/ A10
CTS1/ B10
TXD2 A11
RXD2 B11
RTS2/ A12
CTS2/ B12
TXD3 A13
RXD3 B13
RTS3/ A14
CTS3/ B14
I/F PCB set sig./ A15
Paper sensor sig. B15
Paper rcv. sen. 2 sig. A16
Master count sig. B16
Copy count sig. A17
CK/ B17
LST/ A18
Yukou/ B18
N.C. A19
I/F-RD B19
I/F-WR A20
N.C. B20
D0 A21
D1 B21
D2 A22
D3 B22
D4 A23
D5 B23
D6 A24
D7 B24
A0 A25
A1 B25
A2 A26
A3 B26
N.C. A27
Paper feed det. sen. sig. B27
N.C. A28
N.C. B28
CS/ A29
RD/ B29
WR/ A30
RESET B30
Option PCB A III
CN1
(Available as option)

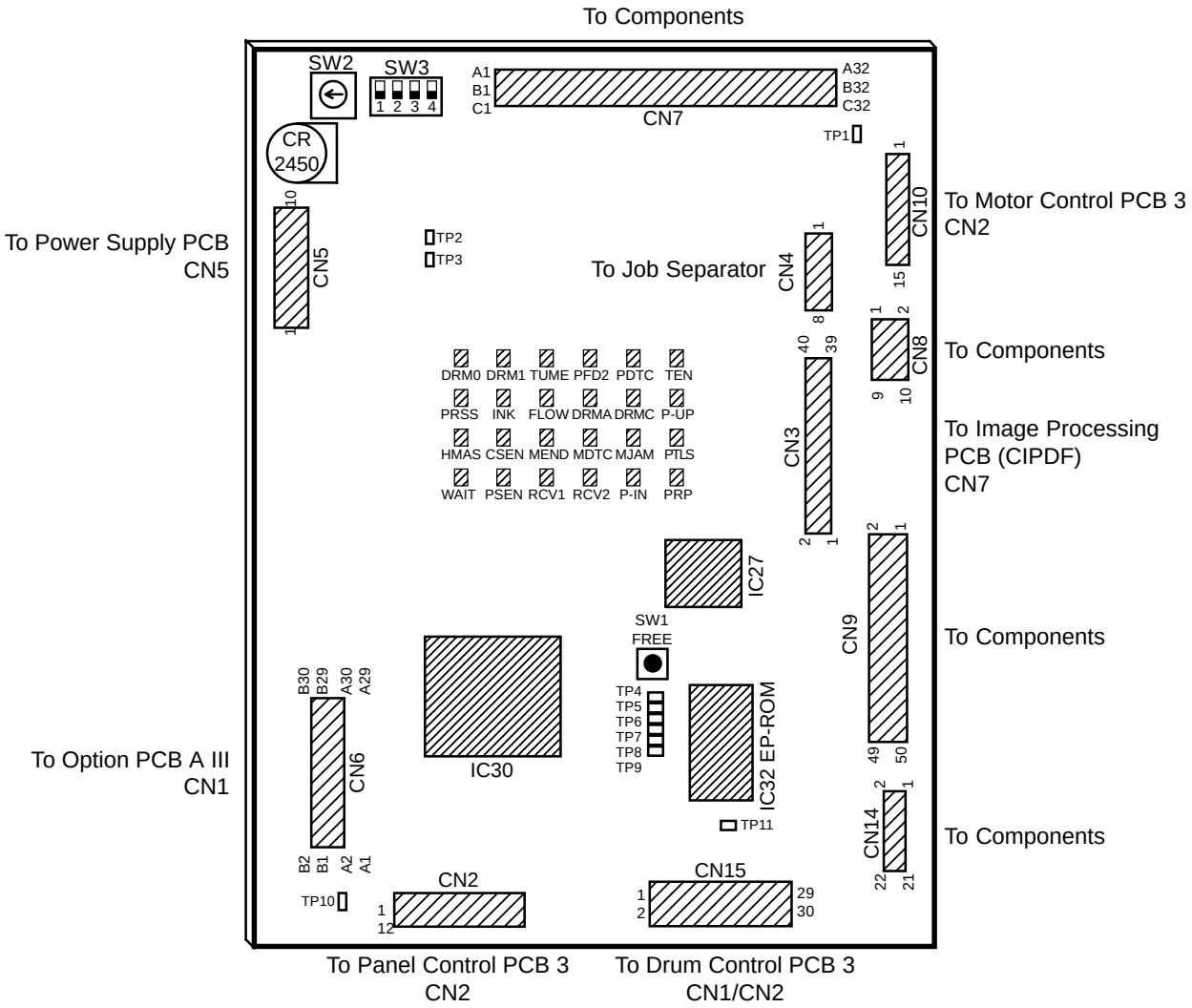

CN7 96pins
GND1 A1 Br Bk SW Master Loading Button
Low when pressed B1 Rd Bk
GND1 C1 Or Br SW Scanner Table Set Switch
Low when pressed A2 Yw Or
Load Pulse Motor (A pulse) B2 Gr 1 Rd M Loading Pulse Motor
+24VA C2 Bl 2 Bk
Load Pulse Motor (B pulse) A3 Vt 3 Bl
Load Pulse Motor (Rev.A pulse) B3 Gy 4 Yw
+24VA C3 Wh 5 Wh
Load Pulse Motor (Rev.B pulse) A4 Bk 6 Or
+5V B4 Br
Low when blocked C4 Rd SEN Pressure Det. Sensor
GND1 A5 Or
Low in operation B5 Yw Bl M Cutter Motor
+24VA C5 Gr Rd
GND1 A6 Bl Wh SW Cutter Motor Switch
Low when pressed B6 Vt Yw
TPH Motor(-)(+24V Increase pressure) C6 Gy 1 Gy Rd M Thermal Pressure Motor
TPH Motor(+)(+24V Decrease pressure) A7 Wh 2 Bk Bl
GND1 B7 Bk 3 Bl SW TPH Home Position Switch
Low when pressed C7 Br 4 Yw
GND1 A8 Rd 5 Wh SW TPH Pressure Switch
Low when pressed B8 Or 6 Or
GND1 C8 Yw 7 Yw Or SEN Master Positioning Sensor
High when opened (Master detected) A9 Gr 8 Gr Wh
+5V B9 Bl 9 Bl Bk
GND1 C9 Vt 10 Vt Bl SEN Master End Sensor (Rcv.)
High when blocked (Master end tape detected) A10 Gy 11 Gy Bl
+5V B10 Wh 12 Wh Bl
13
14
15
16
Clamp Motor(-) opening +24V C10 Bk Rd M Clamp Motor
Clamp Motor(+) closing +24V A11 Br Bl
GND1 B11 Rd Bk SW Clamp Safety Switch
Low when pressed C11 Or Bk
Low in operation A12 Yw Or SOL Clamp Solenoid
+24VC B12 Gr Rd
GND1 C12 Bl Bk 0 SEN 180 Angular Sensor
Low when magnet detected A13 Vt Gy
Low when magnet detected B13 Gy Wh
+5V C13 Wh Or
+5V A14 Bk SEN Vertical Centering Sensor
Low when blocked B14 Br
GND1 C14 Rd
+5V A15 Or SEN Paper Feed Clutch Sensor
Low when blocked B15 Yw
GND1 C15 Gr
GND1 A16 Bl Bk SEN Paper Receiving Sensor 1 (Rcv.)
Low when blocked B16 Vt Wh
+5V C16 Gy Or
GND1 A17 Wh Bk SEN Paper Receiving Sensor 2 (Rcv.)
Low when blocked B17 Bk Gy
+5V C17 Br Or
GND1 A18 Rd Bl SEN Master End/ Master Detection Sensor(Send) /Master Detection Sensor (Rcv.)
High when opened (Master detected) B18 Or Bl
+5V C18 Yw Bl


CN7 96pins
GND1 A19 Gr
Low when pressed B19 Bl
Br
Br
SW
Master Loading Unit Switch
Low in operation C19 Vt
+24VB A20 Gy
N.C. B20
Bk
Rd
F
Separation Fan
(Drive mechanism side)
Low in operation C20 Bk
+24VA A21 Br
Low in operation B21 Rd
+24VB C21 Or
Bl
Rd
Bk
Rd
F
F
Loading Fan
Separation Fan
(Opearation panel side)
GND1 A22 Yw 1
+5V B22 Gr 2
GND1 C22 Bl 3
Low when blocked(Master detected) A23 Vt 4
+5V B23 Gy 5
GND1 C23 Wh 6
Low when master detection A24 Bk 7
+5V B24 Br 8
GND1 C24 Rd 9
Low when pressed A25 Or 10
Low in operation B25 Yw 11
+24VB C25 Gr 12
Low in operation A26 Bl 13
+24VB B26 Vt 14
GND1 C26 Gy 15
Low when pressed A27 Wh 16
+5V B27 Bk 17
Low when blocked(Master detected) C27 Br 18
GND1 A28 Rd 19
+5V B28 Or 20
Low when master not detected C28 Yw 21
GND1 A29 Gr 22
Gy 23
Wh 24
Bk 25
Br 26
Yw
Gr
Bl
Vt
Gy
Wh
Bk
Br
Rd
Or
Yw
Gr
Bl
Vt
Gy
Wh
Bk
Br
Rd
Or
Yw
Gr
Wh
Or
Bk
Wh
Or
Bk
Wh
Or
Bl
Rd
Wh
Rd
Bk
Bk
Rd
Yw
Gr
SEN
Master Removal sensor (Send)
SEN
Master Removal sensor (Rcv.)
SEN
Master Loading Sensor
SW
Disposal Box Set Switch
M
M-R Vertical Trans Motor
SOL
Master Removal Hook Solenoid
SW
Feed Tray Down Button
SEN
Master Removal Hook Sensor
SEN
Disposal Box Master Sensor (Rcv.)
+5V B29 Bl
GND1 C29 Vt
+24VA A30 Gy
Low in operation B30 Wh
+24VA C30 Bk
Low in operation A31 Br
N.C. B31 Rd
N.C. C31 Or
N.C. A32 Yw
N.C. B32 Gr
N.C. C32 Bl
Gy
Wh
Bk
Br
Rd
Bk
Rd
Bk
F
F
Master Removal Fan 1
Master Removal Fan 2
1 Br
2 Rd
3 Or
4 Yw
5 Gr
6 Bl
7 Vt
8
1 Bk
2
3 Bk
4
5
6
7
8
Rd
Wh
Bk
SEN
Disposal Box
Master Sensor
(Send)


CN9 50pins
LOW in operation 1 Br 1 Br Bl M Wing Motor/Suction Motor
+24VA 2 Rd 2 Rd Rd
GND1 3 Or 3 Or SW Jump Wing Switch 1 (Drive Mechanism Side)
LOW when pressed 4 Yw 4 Yw
GND1 5 Gr 5 Gr SW Jump Wing Switch 2 (Operation Panel Side)
LOW when pressed 6 Bl 6 Bl
GND1 7 Vt 7 Vt Bk SEN Paper Rcv. Sensor 1 (Send)
+5V 8 Gy 8 Gy Or
GND1 9 Wh 9 Wh Bk SEN Paper Rcv. Sensor 2 (Send)
+5V 10 Bk 10 Bk Gr
Print pos. motor (A pulse) 11 Br 1 Rd M Print Positioning Motor
+24VC 12 Rd 2 Bk
Print pos. motor (B pulse) 13 Or 3 Bl
Print pos. motor (Rev. A pulse) 14 Yw 4 Yw
+24VC 15 Gr 5 Wh
Print pos. motor (Rev. B pulse) 16 Bl 6 Or
LOW in operation 17 Vt Wh SOL Pressure Solenoid
+24VB 18 Gy Rd
Decrease pressure +24V 19 Wh 1 Bl M Pressure Control Motor
Increase pressure +24V 20 Bk 2 Rd
GND1 21 Br 3 Bk SEN Pressure Control Encoder Sensor
Pressure control encoder 22 Rd 4 Wh
+5V 23 Or 5 Or
+5V 24 Yw SEN Pressure Control Sensor
HIGH when blocked 25 Gr
GND1 26 Bl
+5V 27 Vt 1 Br 1 Vt SEN Paper Detection Sensor
LOW when paper detected 28 Gy 2 Rd 2 Gy
GND1 29 Wh 3 Or 3 Wh
+5V 30 Bk 4 Yw 4 Bk SEN Paper Size Detection Sensor
LOW when paper detected 31 Br 5 Gr 5 Br
GND1 32 Rd 6 Bl 6 Rd
GND 33 Or 7 Vt 7 Or VR Paper Size Potentiometer
Paper size potentiometer 34 Yw 8 Gy 8 Yw
ADVCC 35 Gr 9 Wh 9 Gr
GND1 36 Bl 10 Bk 10 Bl SEN Paper Cassette Size Sensor
LOW in magnet detection 37 Vt 11 Br 11 Vt
LOW in magnet detection 38 Gy 12 Rd 12 Gy
LOW in magnet detection 39 Wh 13 Or 13 Wh
LOW in magnet detection 40 Bk 14 Yw 14 Bk
15 Gr 15 Br SW Paper Feed Tray Safety Switch (Lower)
16 Bl 16 Rd
To Safety Switch(Upper) 1 2
To SF3000 1 Bl 1 Bl 1 To Paper Return Motor of SF3000
2 Rd 2 Rd 2
3 Bk 3 Bk 3
4 Wh 4 Wh 4
GND1 41 Br 5 Br 1 Bk SEN Paper Sensor (Send)
+5V 42 Rd 6 Rd 2 Or
GND1 43 Or 7 Or 3 Bk SEN Paper Feed Det. Sensor/ Paper Sensor (Rcv.)
Low when blocked 44 Yw 8 Yw 4 Wh
Low when blocked 45 Gr 9 Gr 5 Gy
+5V 46 Bl 10 Bl 6 Or
Low in operation 47 Vt 11 Vt Bk SW Stack Paper Feed Switch
+24VB 48 Gy 12 Vt Bk
Low in operation 49 Wh Bl CL Paper Feed Clutch
+24VB 50 Bl
Bk CL Suction Fan Clutch


CN15 30pins
GND1 1 Br 1 Br 1
GND1 2 Rd 2 Rd 2
Ink sensor (HIGH with ink) 3 Or 3 Or 3
Overflow sensor (HIGH with ink) 4 Yw 4 Yw 4
+12V 5 Gr 5 Gr 5
+24VB 6 Bl 6 Bl 6
Inking motor (LOW in operation) 7 Vt 7 Vt 7
GND1 8 Gy 8 Gy 8
Ink LED ON 9 Wh 9 Wh 9
GND1 10 Bk 10 Bk 10
Det. A sensor (LOW when blocked) 11 Br 11 Br 11
Det. C sensor (LOW when blocked) 12 Rd 12 Rd 12
+5V 13 Or 13 Or 13
GND1 14 Yw 14 Yw 14
Drum data signal 1 15 Gr 15 Gr 15
Drum data signal 2 16 Bl 16 Bl 16
Drum data signal 3 17 Vt 17 Vt 17
Drum size data signal 1 18 Gy 18 Gy 18
Drum size data signal 2 19 Wh 19 Wh 19
Ink data signal 1 20 Bk 20 Bk 20
Drum Control PCB 3 CN1
ADGND 21 Br 1 Br 1
Temp. det. sensor 22 Rd 2 Rd 2
AVCC 23 Or 3 Or 3
Ink data signal 2 24 Yw 4 Yw 4
Ink bottle data SW4 25 Gr 5 Gr 5
Ink bottle data SW5 26 Bl 6 Bl 6
GND1 27 7 Vt 7
Ink bottle data SW1 28 Vt 8 Gy 8
Ink bottle data SW2 29 Gy 9 Wh 9
Ink bottle data SW3 30 Wh 10 Bk 10
Bk 11 Br 11
12 Rd 12
Drum Control PCB 3 CN2
CN10 15pins
GND1 1 Gy 1
GND1 2 Gy 2
RESET/ 3 Gy 3
Elevator CTL1 4 Gy 4
Elevator CTL2 5 Gy 5
Main Motor CTL1 6 Gy 6
Main Motor CTL2 7 Gy 7
Main Motor CTL3 8 Gy 8
Main Motor CTL4 9 Gy 9
Det. A signal 10 Gy 10
Paper tray pos. sig. 11 Gy 11
Paper feed safety sig. 12 Gy 12
Lower limit sig. 13 Gy 13
Main Motor stop sig. 14 Gy 14
P-F pressure adj. sw. sig. 15 Gy 15
Motor Control PCB 2 CN2
CN14 22pins
Write P/M (A pulse) 1 Br 1 Rd
+24VA 2 Rd 2 Bk
Write P/M (B pulse) 3 Or 3 Bl
Write P/M (Rev. A pulse) 4 Yw 4 Yw
+24VA 5 Gr 5 Wh
Write P/M (Rev. B pulse) 6 Bl 6 Or
GND1 7 Vt 1 Bk
LOW when pressed 8 Gy 2 Bk
LOW when lit 9 Wh 3 Or
+24VA 10 Bk 4 Yw
GND1 11 Br
LOW when pressed 12 Rd
GND1 13 Or Bk
HIGH when closed 14 Yw Br
LOW in operation 15 Gr Bl
+24VB 16 Bl Rd
LOW in operation 17 Vt 1 Br
+24VB 18 Gy 2 Rd
LOW in operation 19 Wh 3 Or
+24VB 20 Bk 4 Yw
GND1 21 Br 5 Gr
LOW when connected 22 Rd 6
Counter set signal
M
Write Pulse Motor
SW
Drum Home Position Button
Lamp
Drum Home Position Lamp
SW
Drum Set Switch
SW
Front Cover Set Switch
SOL
Lock Solenoid
MC
Master Counter
TC
Copy Counter

3-2. System PCB 4



SW

SW1 :Drum (Main motor) 30 rpm

SW2 :Machine Selection HEX SW
Please refer APPENDIX for the detail

SW3 :Machine Selection Dip SW
Please refer APPENDIX for the detail

LED

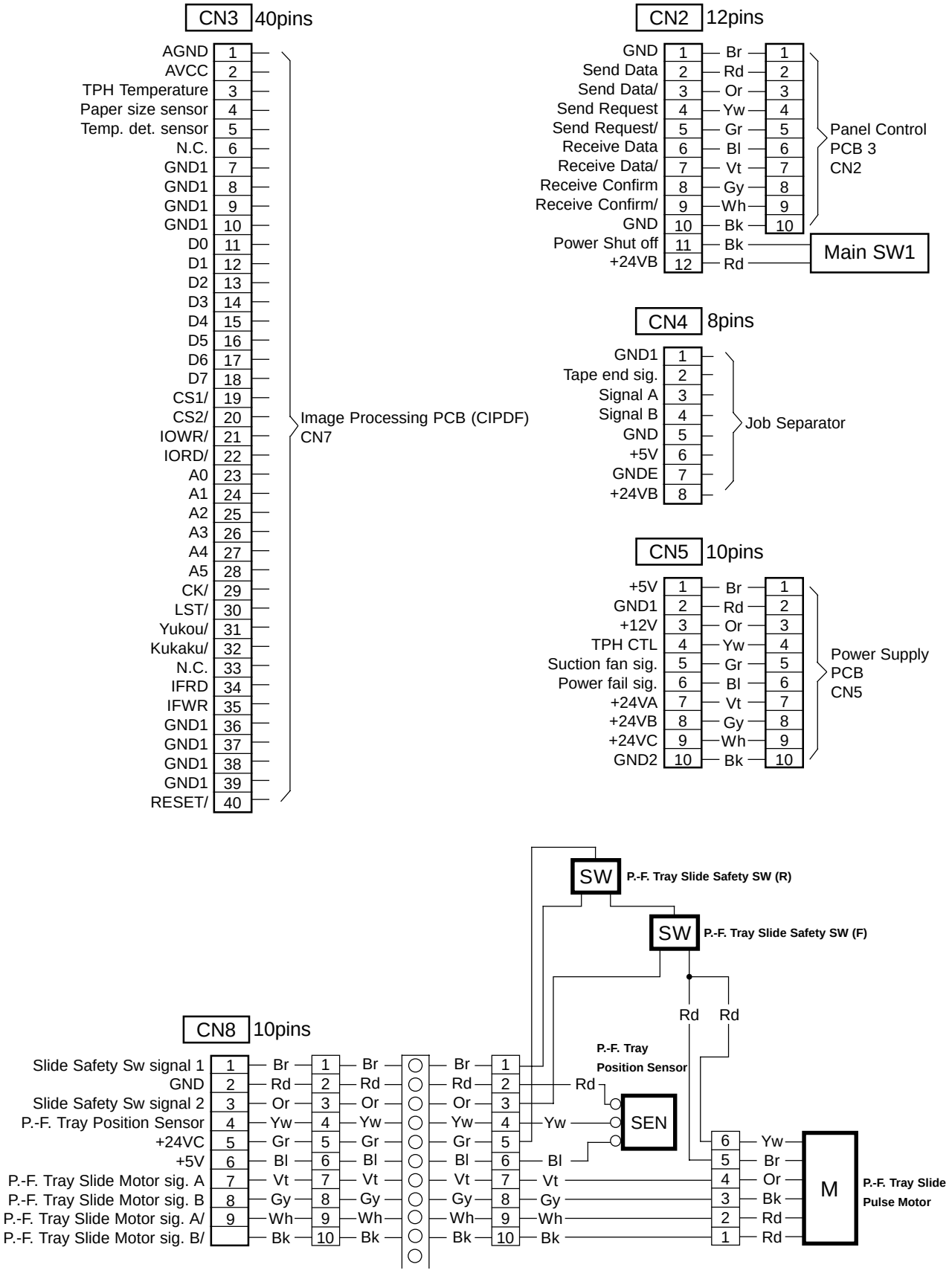
LED	Sensor Name	When LED is ON
DRM0	0 Angular Sensor	Magnetism is detected
DRM1	180 Angular Sensor	Magnetism is detected
PDTC	Paper Detection Sensor	Reflected light detected
TEN	Vertical Centering Sensor	Light path is blocked
INK	Ink Sensor	Ink is not detected
FLOW	Overflow Sensor	Ink is not detected
DRMA	Position A Sensor	Light path is blocked
DRMC	Position C Sensor	Light path is blocked
P-UP	Elevator Upper Limit Sensor	Light path is opened (actuator pressed)
HMAS	Disposal Box Master Sensor	Light path is opened (Master not detected)
CSEN	Master Loading Sensor	Reflected light (Master) detected
MEND	Master END Sensor	Reflected light (Master) detected
MDTC	Master Detection Sensor	Reflected light (Master) not detected
MJAM	Master Removal Sensor	Light path is blocked (Master detected)
PTLS	Paper Size Detection Sensor	Reflected light (Paper) detected
WAIT	Master Positioning Sensor	Reflected light (Master) not detected
PSEN	Paper Sensor	Light path is blocked (Paper detected)
RCV1	Paper Receiving Sensor 1	Light path is blocked (Paper detected)
RCV2	Paper Receiving Sensor 2	Light path is blocked (Paper detected)
P-IN	Paper Feed Detection Sensor	Light path is blocked (Paper detected)
PRP	Pressure Control Sensor	Light path is opened
TUME	Master Removal Hook Sensor	Light path is opened

TP

TP1 (GND)	Ground for +5V lines	TP7 (AKEN)	+5V
TP2 (GNDE)	Ground for +24V lines	TP8 (NMI)	+5V
TP3 (GND)	Ground for +5V lines	TP9 (RESET)	+5V
TP4 (PRESS)	+5V	TP10 (GND)	Ground for +5V lines
TP5 (PKEN)	+5V	TP11 (GND)	Ground for +5V lines
TP6 (CKEN)	+5V		

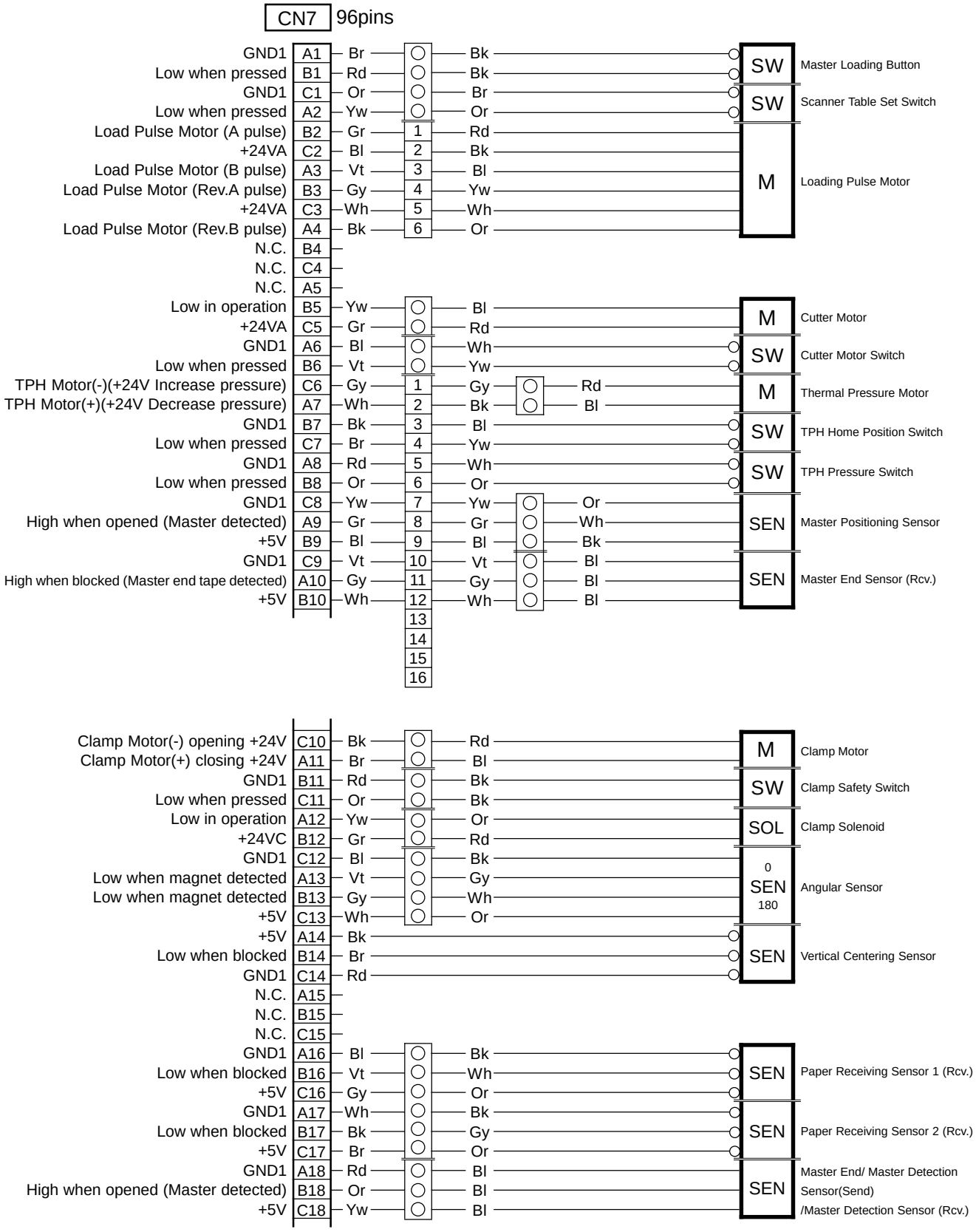
Battery

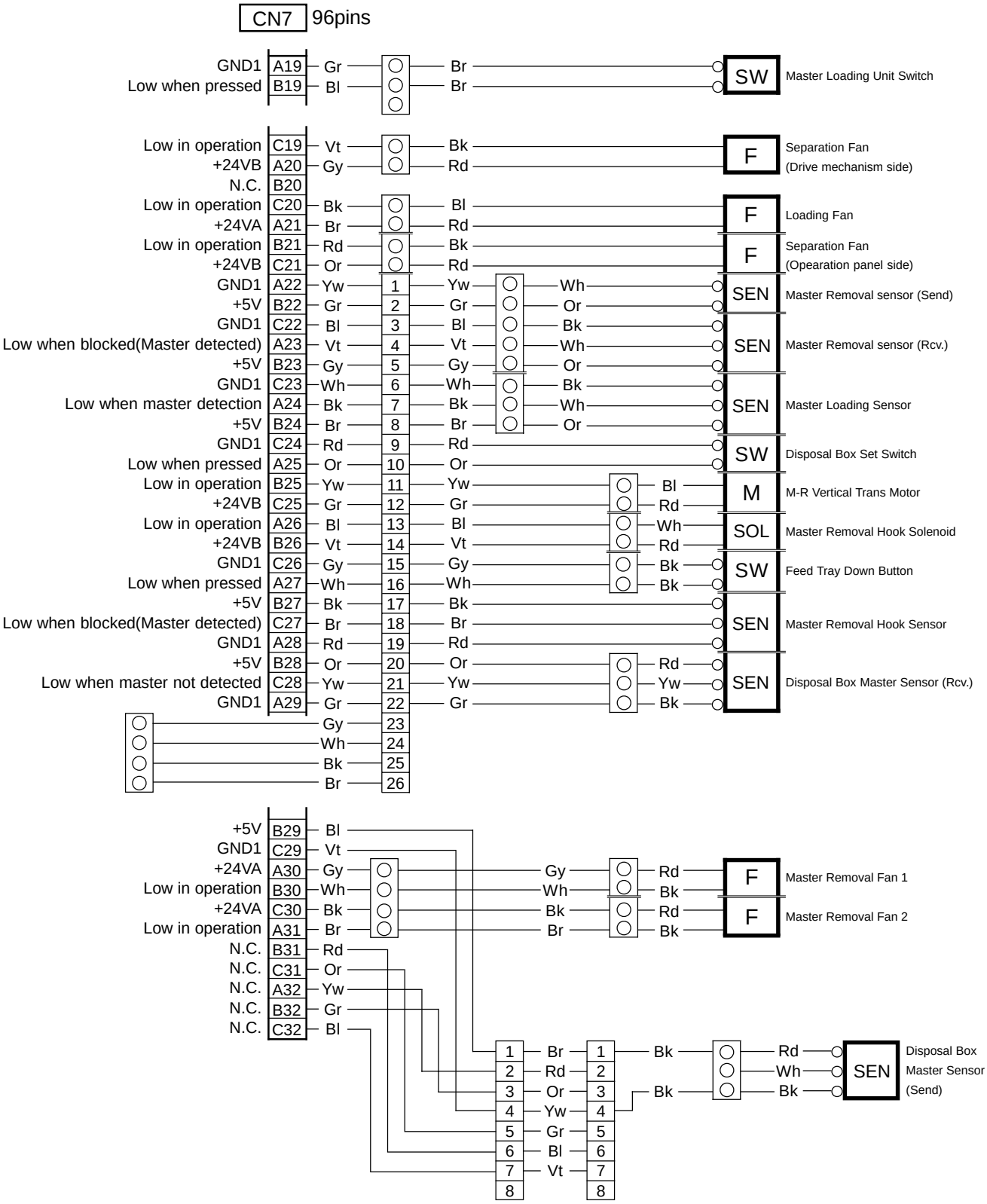
CR2450	1 piece

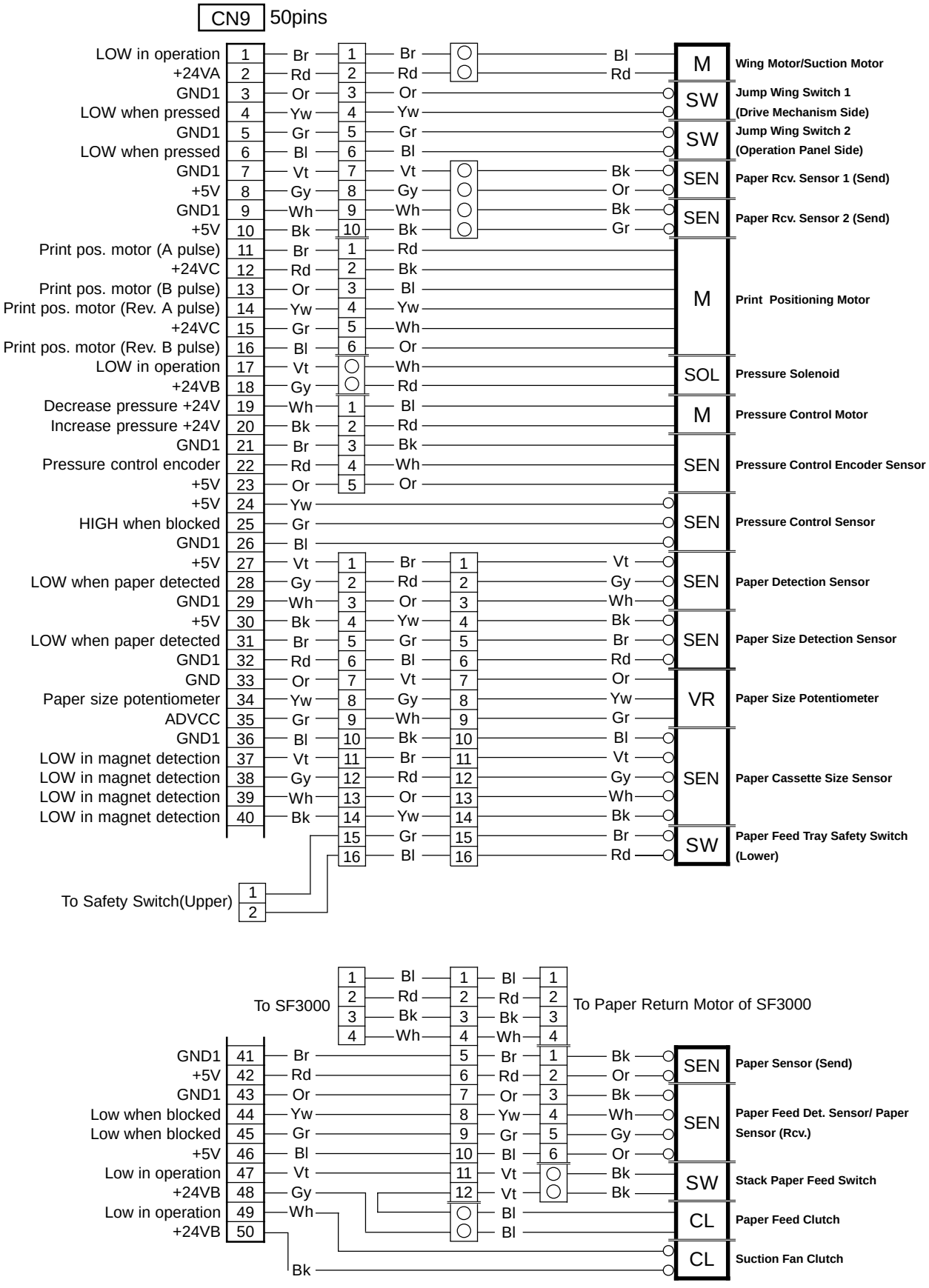

CN3 40pins
AGND 1
AVCC 2
TPH Temperature 3
Paper size sensor 4
Temp. det. sensor 5
N.C. 6
GND1 7
GND1 8
GND1 9
GND1 10
D0 11
D1 12
D2 13
D3 14
D4 15
D5 16
D6 17
D7 18
CS1/ 19
CS2/ 20
IOWR/ 21
IORD/ 22
A0 23
A1 24
A2 25
A3 26
A4 27
A5 28
CK/ 29
LST/ 30
Yukou/ 31
Kukaku/ 32
N.C. 33
IFRD 34
IFWR 35
GND1 36
GND1 37
GND1 38
GND1 39
RESET/ 40
Image Processing PCB (CIPDF)
CN7
CN2 12pins
GND 1 Br 1
Send Data 2 Rd 2
Send Data/ 3 Or 3
Send Request 4 Yw 4
Send Request/ 5 Gr 5
Receive Data 6 Bl 6
Receive Data/ 7 Vt 7
Receive Confirm 8 Gy 8
Receive Confirm/ 9 Wh 9
GND 10 Bk 10
Power Shut off 11 Bk
+24VB 12 Rd
Panel Control
PCB 3
CN2
Main SW1
CN4 8pins
GND1 1
Tape end sig. 2
Signal A 3
Signal B 4
GND 5
+5V 6
GNDE 7
+24VB 8
Job Separator
CN5 10pins
+5V 1 Br 1
GND1 2 Rd 2
+12V 3 Or 3
TPH CTL 4 Yw 4
Suction fan sig. 5 Gr 5
Power fail sig. 6 Bl 6
+24VA 7 Vt 7
+24VB 8 Gy 8
+24VC 9 Wh 9
GND2 10 Bk 10
Power Supply
PCB
CN5
SW P.-F. Tray Slide Safety SW (R)
SW P.-F. Tray Slide Safety SW (F)
Rd Rd
P.-F. Tray
Position Sensor
SEN
CN8 10pins
Slide Safety Sw signal 1 1 Br
GND 2 Rd
Slide Safety Sw signal 2 3 Or
P.-F. Tray Position Sensor 4 Yw
+24VC 5 Gr
+5V 6 Bl
P.-F. Tray Slide Motor sig. A 7 Vt
P.-F. Tray Slide Motor sig. B 8 Gy
P.-F. Tray Slide Motor sig. A/ 9 Wh
P.-F. Tray Slide Motor sig. B/ Bk
M
P.-F. Tray Slide
Pulse Motor

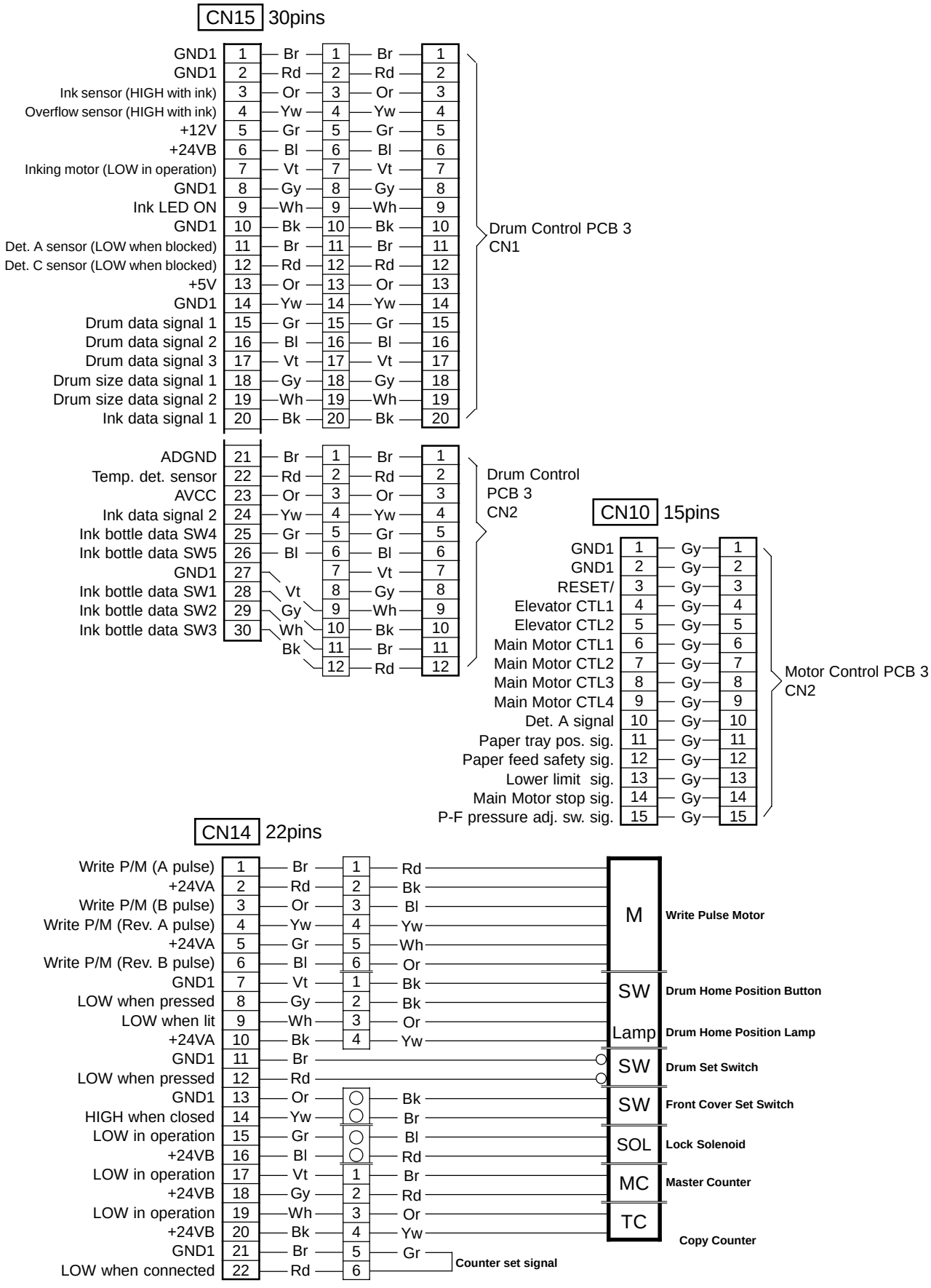
CN6 60pins

GND1	A1	
GND1	B1	
GND1	A2	
GND1	B2	
GND1	A3	
GND1	B3	
+5V	A4	
+5V	B4	
+5V	A5	
+5V	B5	
GND2	A6	
GND2	B6	
GND2	A7	
+24VB	B7	
+24VB	A8	
+24VB	B8	
TXD1	A9	
RXD1	B9	
RTS1/	A10	
CTS1/	B10	
TXD2	A11	
RXD2	B11	
RTS2/	A12	
CTS2/	B12	
TXD3	A13	
RXD3	B13	
RTS3/	A14	
CTS3/	B14	
I/F PCB set sig./	A15	Option PCB A III CN1 (FR3950α available as standard) (FR3950 available as option)
Paper sensor sig.	B15	
Paper rcv. sen. 2 sig.	A16	
Master count sig.	B16	
Copy count sig.	A17	
CK/	B17	
LST/	A18	
Yukou/	B18	
N.C.	A19	
I/F-RD	B19	
I/F-WR	A20	
N.C.	B20	
D0	A21	
D1	B21	
D2	A22	
D3	B22	
D4	A23	
D5	B23	
D6	A24	
D7	B24	
A0	A25	
A1	B25	
A2	A26	
A3	B26	
N.C.	A27	
Paper feed det. sen. sig.	B27	
N.C.	A28	
N.C.	B28	
CS/	A29	
RD/	B29	
WR/	A30	
RESET	B30	

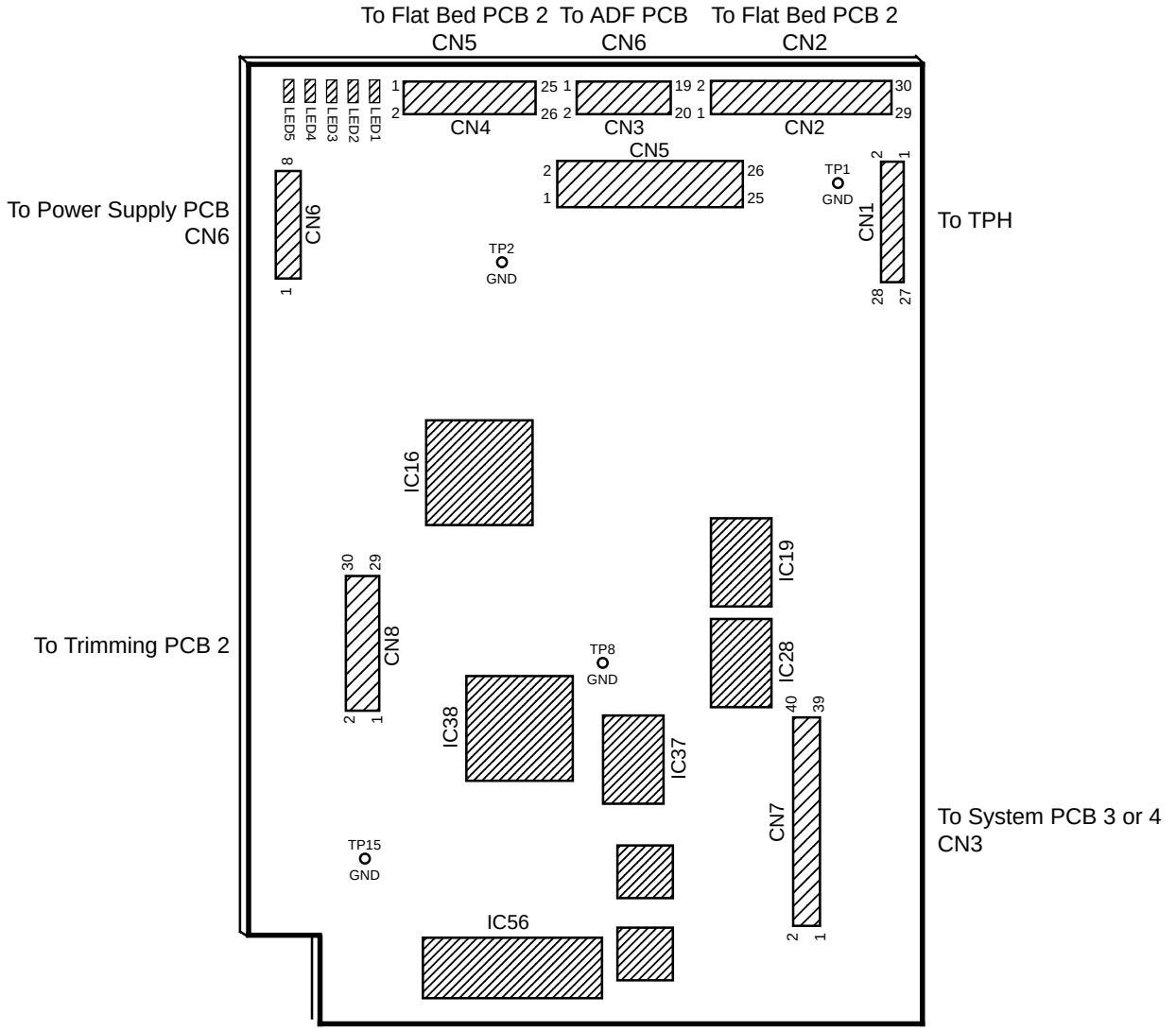

CN7 96pins
GND1 A1 Br Bk SW Master Loading Button
Low when pressed B1 Rd Bk
GND1 C1 Or Br SW Scanner Table Set Switch
Low when pressed A2 Yw Or
Load Pulse Motor (A pulse) B2 Gr 1 Rd M Loading Pulse Motor
+24VA C2 Bl 2 Bk
Load Pulse Motor (B pulse) A3 Vt 3 Bl
Load Pulse Motor (Rev.A pulse) B3 Gy 4 Yw
+24VA C3 Wh 5 Wh
Load Pulse Motor (Rev.B pulse) A4 Bk 6 Or
N.C. B4
N.C. C4
N.C. A5
Low in operation B5 Yw Bl M Cutter Motor
+24VA C5 Gr Rd
GND1 A6 Bl Wh SW Cutter Motor Switch
Low when pressed B6 Vt Yw
TPH Motor(-)(+24V Increase pressure) C6 Gy 1 Gy Rd M Thermal Pressure Motor
TPH Motor(+)(+24V Decrease pressure) A7 Wh 2 Bk Bl
GND1 B7 Bk 3 Bl SW TPH Home Position Switch
Low when pressed C7 Br 4 Yw
GND1 A8 Rd 5 Wh SW TPH Pressure Switch
Low when pressed B8 Or 6 Or
GND1 C8 Yw 7 Yw Or SEN Master Positioning Sensor
High when opened (Master detected) A9 Gr 8 Gr Wh
+5V B9 Bl 9 Bl Bk
GND1 C9 Vt 10 Vt Bl SEN Master End Sensor (Rcv.)
High when blocked (Master end tape detected) A10 Gy 11 Gy Bl
+5V B10 Wh 12 Wh Bl
13
14
15
16
Clamp Motor(-) opening +24V C10 Bk Rd M Clamp Motor
Clamp Motor(+) closing +24V A11 Br Bl
GND1 B11 Rd Bk SW Clamp Safety Switch
Low when pressed C11 Or Bk
Low in operation A12 Yw Or SOL Clamp Solenoid
+24VC B12 Gr Rd
GND1 C12 Bl Bk 0 SEN 180 Angular Sensor
Low when magnet detected A13 Vt Gy
Low when magnet detected B13 Gy Wh
+5V C13 Wh Or
+5V A14 Bk SEN Vertical Centering Sensor
Low when blocked B14 Br
GND1 C14 Rd
N.C. A15
N.C. B15
N.C. C15
GND1 A16 Bl Bk SEN Paper Receiving Sensor 1 (Rcv.)
Low when blocked B16 Vt Wh
+5V C16 Gy Or
GND1 A17 Wh Bk SEN Paper Receiving Sensor 2 (Rcv.)
Low when blocked B17 Bk Gy
+5V C17 Br Or
GND1 A18 Rd Bl SEN Master End/ Master Detection Sensor(Send) /Master Detection Sensor (Rcv.)
High when opened (Master detected) B18 Or Bl
+5V C18 Yw Bl


CN7 96pins
GND1 A19 Gr
Low when pressed B19 Bl
Br
Br
SW
Master Loading Unit Switch
Low in operation C19 Vt
+24VB A20 Gy
Bk
Rd
F
Separation Fan
(Drive mechanism side)
N.C. B20
Low in operation C20 Bk
+24VA A21 Br
Bl
Rd
F
Loading Fan
Low in operation B21 Rd
+24VB C21 Or
Bk
Rd
F
Separation Fan
(Opearation panel side)
GND1 A22 Yw
+5V B22 Gr
GND1 C22 Bl
Low when blocked(Master detected) A23 Vt
+5V B23 Gy
GND1 C23 Wh
Low when master detection A24 Bk
+5V B24 Br
GND1 C24 Rd
Low when pressed A25 Or
Low in operation B25 Yw
+24VB C25 Gr
Low in operation A26 Bl
+24VB B26 Vt
GND1 C26 Gy
Low when pressed A27 Wh
+5V B27 Bk
Low when blocked(Master detected) C27 Br
GND1 A28 Rd
+5V B28 Or
Low when master not detected C28 Yw
GND1 A29 Gr
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
Yw Gr Bl Vt Gy Wh Bk Br Rd Or Yw Gr Bl Vt Gy Wh Bk Br Rd Or Yw Gr
Wh Or Bk Wh Or Bk Wh Or
SEN
Master Removal sensor (Send)
SEN
Master Removal sensor (Rcv.)
SEN
Master Loading Sensor
SW
Disposal Box Set Switch
Bl Rd
M
M-R Vertical Trans Motor
Wh Rd
SOL
Master Removal Hook Solenoid
Bk Bk
SW
Feed Tray Down Button
SEN
Master Removal Hook Sensor
Rd Yw Bk
SEN
Disposal Box Master Sensor (Rcv.)
Gy
Wh
Bk
Br
23 24 25 26
+5V B29 Bl
GND1 C29 Vt
+24VA A30 Gy
Low in operation B30 Wh
+24VA C30 Bk
Low in operation A31 Br
N.C. B31 Rd
N.C. C31 Or
N.C. A32 Yw
N.C. B32 Gr
N.C. C32 Bl
Gy Wh Bk Br
Rd Bk Rd Bk
F
Master Removal Fan 1
F
Master Removal Fan 2
1 2 3 4 5 6 7 8
Br Rd Or Yw Gr Bl Vt
1 2 3 4 5 6 7 8
Bk Bk
Rd Wh Bk
SEN
Disposal Box
Master Sensor
(Send)


CN9 50pins
LOW in operation 1 Br 1 Br Bl M Wing Motor/Suction Motor
+24VA 2 Rd 2 Rd Rd
GND1 3 Or 3 Or SW Jump Wing Switch 1 (Drive Mechanism Side)
LOW when pressed 4 Yw 4 Yw
GND1 5 Gr 5 Gr SW Jump Wing Switch 2 (Operation Panel Side)
LOW when pressed 6 Bl 6 Bl
GND1 7 Vt 7 Vt Bk SEN Paper Rcv. Sensor 1 (Send)
+5V 8 Gy 8 Gy Or
GND1 9 Wh 9 Wh Bk SEN Paper Rcv. Sensor 2 (Send)
+5V 10 Bk 10 Bk Gr
Print pos. motor (A pulse) 11 Br 1 Rd M Print Positioning Motor
+24VC 12 Rd 2 Bk
Print pos. motor (B pulse) 13 Or 3 Bl
Print pos. motor (Rev. A pulse) 14 Yw 4 Yw
+24VC 15 Gr 5 Wh
Print pos. motor (Rev. B pulse) 16 Bl 6 Or
LOW in operation 17 Vt Wh SOL Pressure Solenoid
+24VB 18 Gy Rd
Decrease pressure +24V 19 Wh 1 Bl M Pressure Control Motor
Increase pressure +24V 20 Bk 2 Rd
GND1 21 Br 3 Bk SEN Pressure Control Encoder Sensor
Pressure control encoder 22 Rd 4 Wh
+5V 23 Or 5 Or
+5V 24 Yw SEN Pressure Control Sensor
HIGH when blocked 25 Gr
GND1 26 Bl
+5V 27 Vt 1 Br 1 Vt SEN Paper Detection Sensor
LOW when paper detected 28 Gy 2 Rd 2 Gy
GND1 29 Wh 3 Or 3 Wh
+5V 30 Bk 4 Yw 4 Bk SEN Paper Size Detection Sensor
LOW when paper detected 31 Br 5 Gr 5 Br
GND1 32 Rd 6 Bl 6 Rd
GND 33 Or 7 Vt 7 Or VR Paper Size Potentiometer
Paper size potentiometer 34 Yw 8 Gy 8 Yw
ADVCC 35 Gr 9 Wh 9 Gr
GND1 36 Bl 10 Bk 10 Bl SEN Paper Cassette Size Sensor
LOW in magnet detection 37 Vt 11 Br 11 Vt
LOW in magnet detection 38 Gy 12 Rd 12 Gy
LOW in magnet detection 39 Wh 13 Or 13 Wh
LOW in magnet detection 40 Bk 14 Yw 14 Bk
15 Gr 15 Br SW Paper Feed Tray Safety Switch (Lower)
16 Bl 16 Rd
To Safety Switch(Upper) 1 2
To SF3000 1 Bl 1 Bl 1 To Paper Return Motor of SF3000
2 Rd 2 Rd 2
3 Bk 3 Bk 3
4 Wh 4 Wh 4
GND1 41 Br 5 Br 1 Bk SEN Paper Sensor (Send)
+5V 42 Rd 6 Rd 2 Or
GND1 43 Or 7 Or 3 Bk SEN Paper Feed Det. Sensor/ Paper Sensor (Rcv.)
Low when blocked 44 Yw 8 Yw 4 Wh
Low when blocked 45 Gr 9 Gr 5 Gy
+5V 46 Bl 10 Bl 6 Or
Low in operation 47 Vt 11 Vt Bk SW Stack Paper Feed Switch
+24VB 48 Gy 12 Vt Bk
Low in operation 49 Wh Bl CL Paper Feed Clutch
+24VB 50 Bl
Bk CL Suction Fan Clutch


CN15 30pins
GND1 1 Br 1 Br 1
GND1 2 Rd 2 Rd 2
Ink sensor (HIGH with ink) 3 Or 3 Or 3
Overflow sensor (HIGH with ink) 4 Yw 4 Yw 4
+12V 5 Gr 5 Gr 5
+24VB 6 Bl 6 Bl 6
Inking motor (LOW in operation) 7 Vt 7 Vt 7
GND1 8 Gy 8 Gy 8
Ink LED ON 9 Wh 9 Wh 9
GND1 10 Bk 10 Bk 10
Det. A sensor (LOW when blocked) 11 Br 11 Br 11
Det. C sensor (LOW when blocked) 12 Rd 12 Rd 12
+5V 13 Or 13 Or 13
GND1 14 Yw 14 Yw 14
Drum data signal 1 15 Gr 15 Gr 15
Drum data signal 2 16 Bl 16 Bl 16
Drum data signal 3 17 Vt 17 Vt 17
Drum size data signal 1 18 Gy 18 Gy 18
Drum size data signal 2 19 Wh 19 Wh 19
Ink data signal 1 20 Bk 20 Bk 20
Drum Control PCB 3 CN1
ADGND 21 Br 1 Br 1
Temp. det. sensor 22 Rd 2 Rd 2
AVCC 23 Or 3 Or 3
Ink data signal 2 24 Yw 4 Yw 4
Ink bottle data SW4 25 Gr 5 Gr 5
Ink bottle data SW5 26 Bl 6 Bl 6
GND1 27 7 Vt 7
Ink bottle data SW1 28 Vt 8 Gy 8
Ink bottle data SW2 29 Gy 9 Wh 9
Ink bottle data SW3 30 Wh 10 Bk 10
Bk 11 Br 11
12 Rd 12
Drum Control PCB 3 CN2
CN10 15pins
GND1 1 Gy 1
GND1 2 Gy 2
RESET/ 3 Gy 3
Elevator CTL1 4 Gy 4
Elevator CTL2 5 Gy 5
Main Motor CTL1 6 Gy 6
Main Motor CTL2 7 Gy 7
Main Motor CTL3 8 Gy 8
Main Motor CTL4 9 Gy 9
Det. A signal 10 Gy 10
Paper tray pos. sig. 11 Gy 11
Paper feed safety sig. 12 Gy 12
Lower limit sig. 13 Gy 13
Main Motor stop sig. 14 Gy 14
P-F pressure adj. sw. sig. 15 Gy 15
Motor Control PCB 3 CN2
CN14 22pins
Write P/M (A pulse) 1 Br 1 Rd
+24VA 2 Rd 2 Bk
Write P/M (B pulse) 3 Or 3 Bl
Write P/M (Rev. A pulse) 4 Yw 4 Yw
+24VA 5 Gr 5 Wh
Write P/M (Rev. B pulse) 6 Bl 6 Or
GND1 7 Vt 1 Bk
LOW when pressed 8 Gy 2 Bk
LOW when lit 9 Wh 3 Or
+24VA 10 Bk 4 Yw
GND1 11 Br
LOW when pressed 12 Rd
GND1 13 Or Bk
HIGH when closed 14 Yw Br
LOW in operation 15 Gr Bl
+24VB 16 Bl Rd
LOW in operation 17 Vt 1 Br
+24VB 18 Gy 2 Rd
LOW in operation 19 Wh 3 Or
+24VB 20 Bk 4 Yw
GND1 21 Br 5 Gr
LOW when connected 22 Rd 6
Counter set signal
M
Write Pulse Motor
SW
Drum Home Position Button
Lamp
Drum Home Position Lamp
SW
Drum Set Switch
SW
Front Cover Set Switch
SOL
Lock Solenoid
MC
Master Counter
TC
Copy Counter

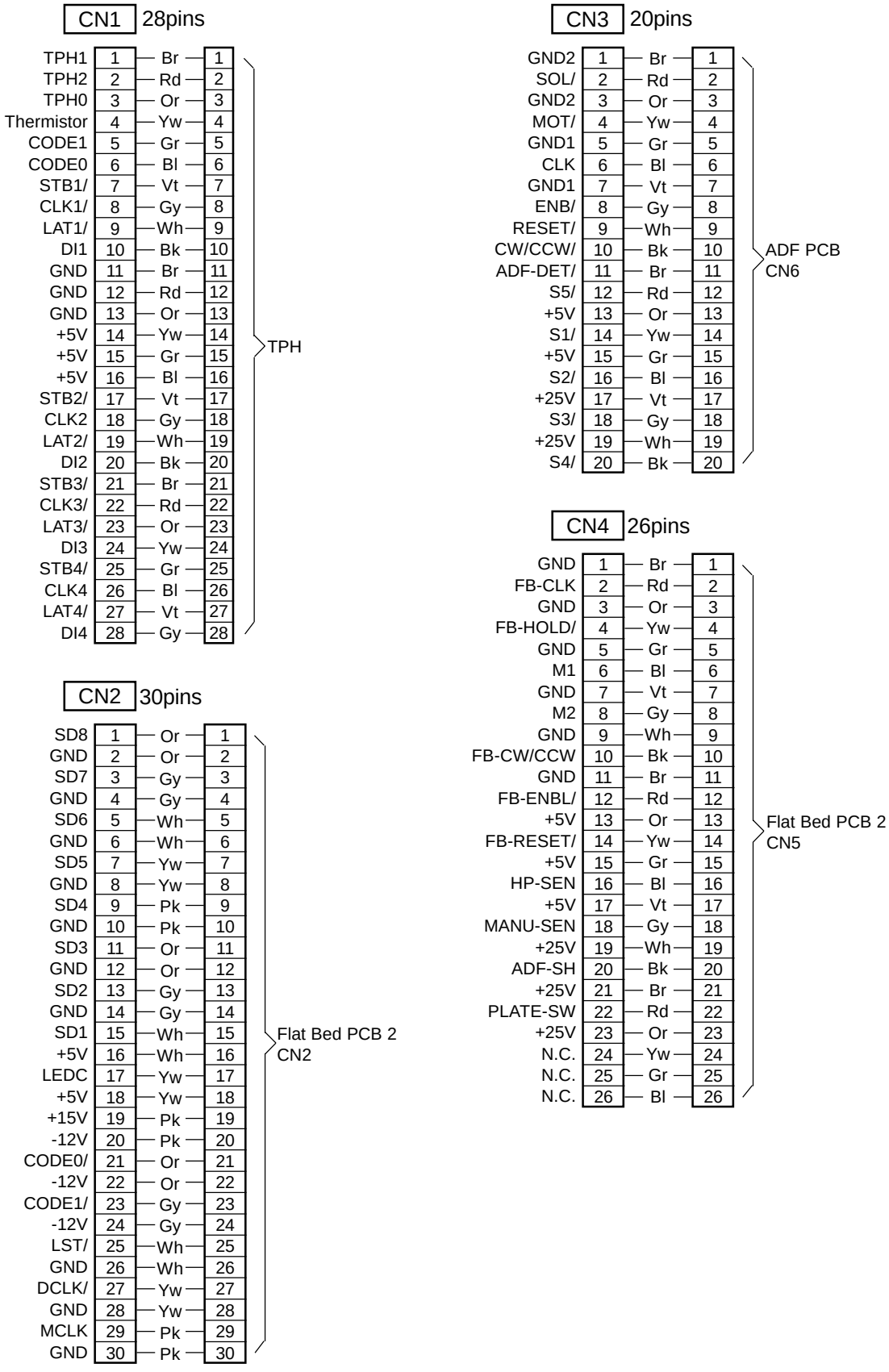
4. IMAGE PROCESSING PCB (CIPDF)



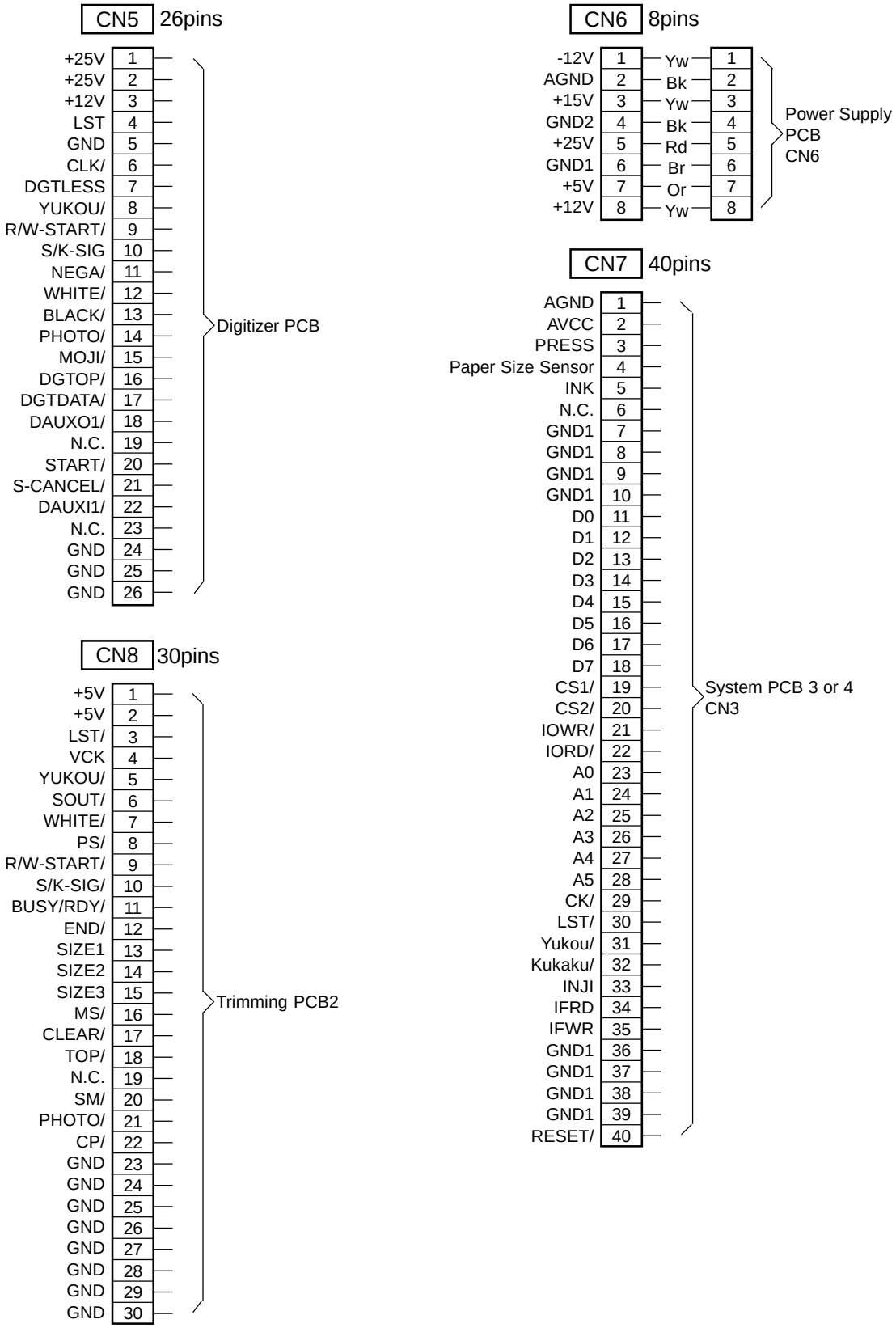
LED	
LED1	:+5V
LED2	:-12VA
LED3	:+15VA
LED4	:+12V
LED5	:+24V

TPH	
TP1	:GND
TP2	:GND
TP8	:GND
TP15	:GND

4. IMAGE PROCESSING PCB (CIPDF)(2/3)

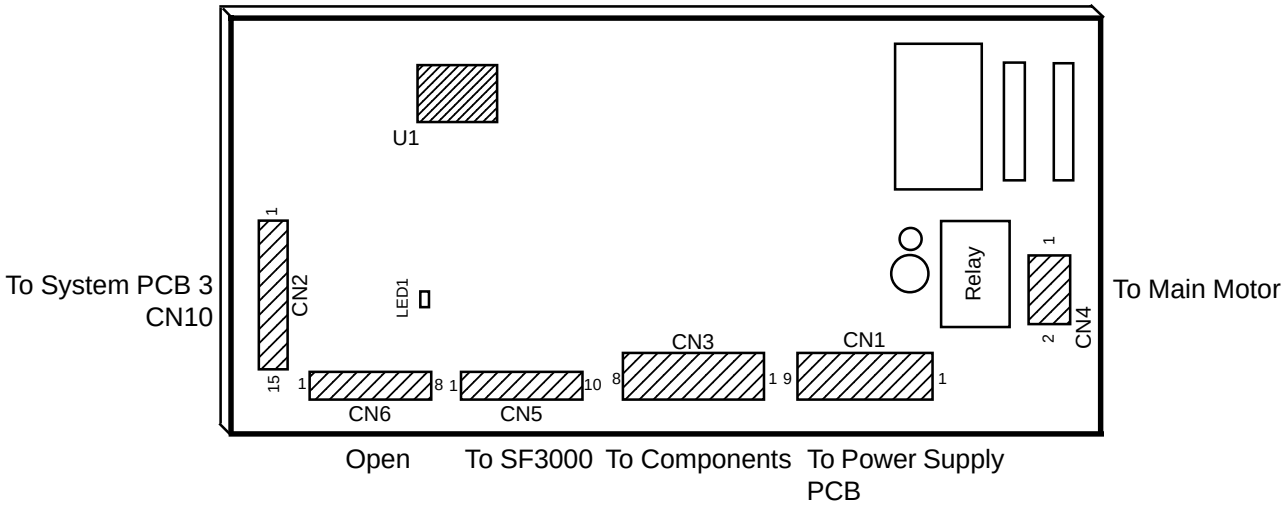


4. IMAGE PROCESSING PCB (CIPDF)(3/3)



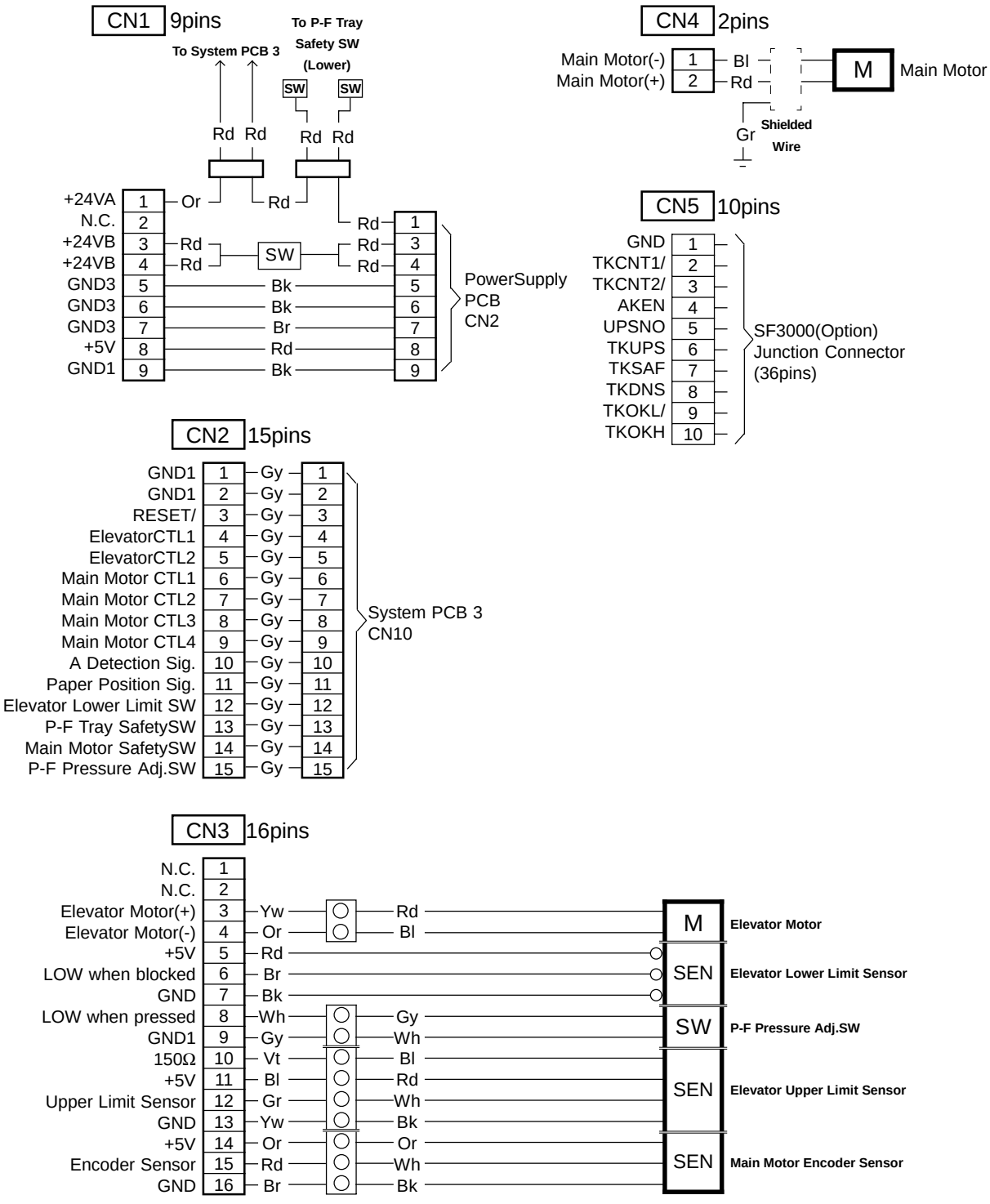
5. MOTOR CONTROL PCB

5-1. Motor Control PCB 2

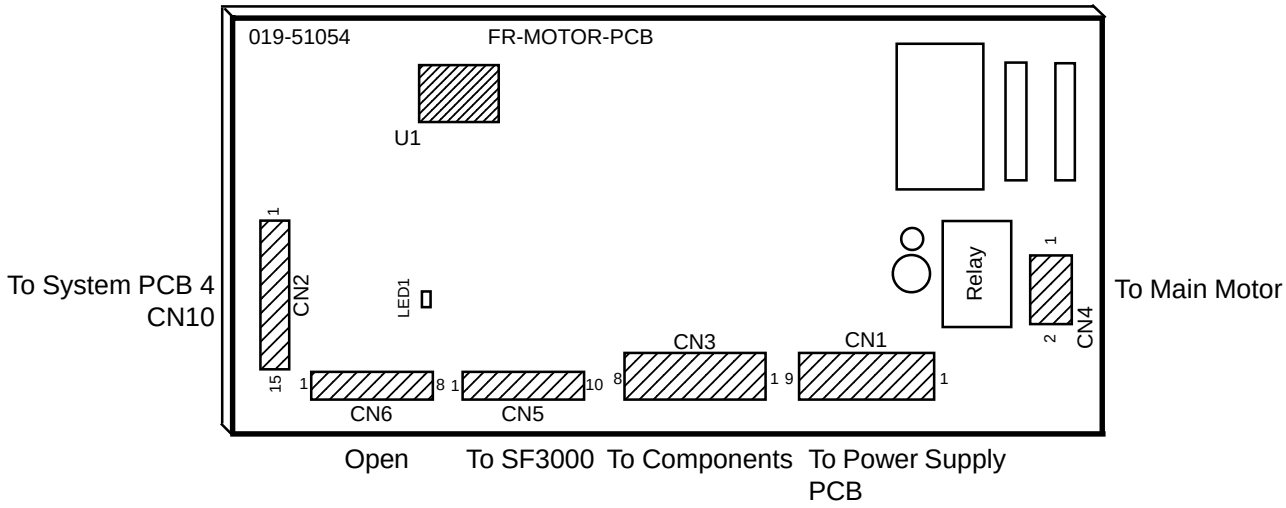


LED **- When LED is ON -**

LED1: The actuator of Elevator upper limit sensor is raised to open the light path.

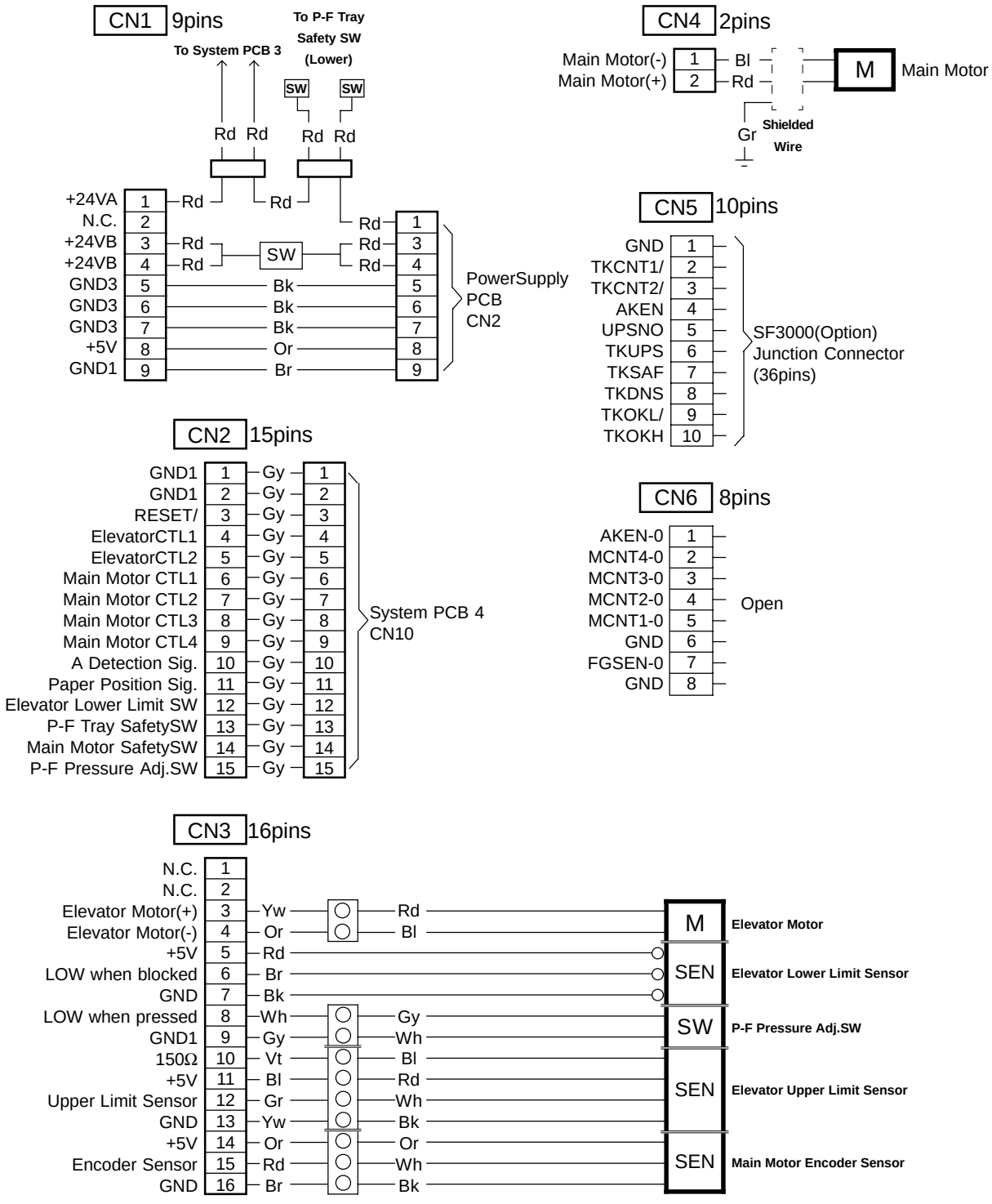

CN1 9pins
To System PCB 3
To P-F Tray Safety SW (Lower)
SW
SW
Rd Rd Rd Rd
+24VA 1 Or
N.C. 2
+24VB 3 Rd
+24VB 4 Rd
GND3 5 Bk
GND3 6 Bk
GND3 7 Br
+5V 8 Rd
GND1 9 Bk
SW
Rd
Rd
Rd
1
3
4
5
6
7
8
9
PowerSupply PCB CN2
CN4 2pins
Main Motor(-) 1 Bl
Main Motor(+) 2 Rd
M
Main Motor
Gr
Shielded Wire
CN5 10pins
GND 1
TKCNT1/ 2
TKCNT2/ 3
AKEN 4
UPSNO 5
TKUPS 6
TKSAF 7
TKDNS 8
TKOKL/ 9
TKOKH 10
SF3000(Option) Junction Connector (36pins)
CN2 15pins
GND1 1 Gy 1
GND1 2 Gy 2
RESET/ 3 Gy 3
ElevatorCTL1 4 Gy 4
ElevatorCTL2 5 Gy 5
Main Motor CTL1 6 Gy 6
Main Motor CTL2 7 Gy 7
Main Motor CTL3 8 Gy 8
Main Motor CTL4 9 Gy 9
A Detection Sig. 10 Gy 10
Paper Position Sig. 11 Gy 11
Elevator Lower Limit SW 12 Gy 12
P-F Tray SafetySW 13 Gy 13
Main Motor SafetySW 14 Gy 14
P-F Pressure Adj.SW 15 Gy 15
System PCB 3 CN10
CN3 16pins
N.C. 1
N.C. 2
Elevator Motor(+) 3 Yw Rd
Elevator Motor(-) 4 Or Bl
+5V 5 Rd
LOW when blocked 6 Br
GND 7 Bk
LOW when pressed 8 Wh Gy
GND1 9 Gy Wh
150Ω 10 Vt Bl
+5V 11 Bl Rd
Upper Limit Sensor 12 Gr Wh
GND 13 Yw Bk
+5V 14 Or Or
Encoder Sensor 15 Rd Wh
GND 16 Br Bk
M
Elevator Motor
SEN
Elevator Lower Limit Sensor
SW
P-F Pressure Adj.SW
SEN
Elevator Upper Limit Sensor
SEN
Main Motor Encoder Sensor

5-2. Motor Control PCB 3



LED **- When LED is ON -**

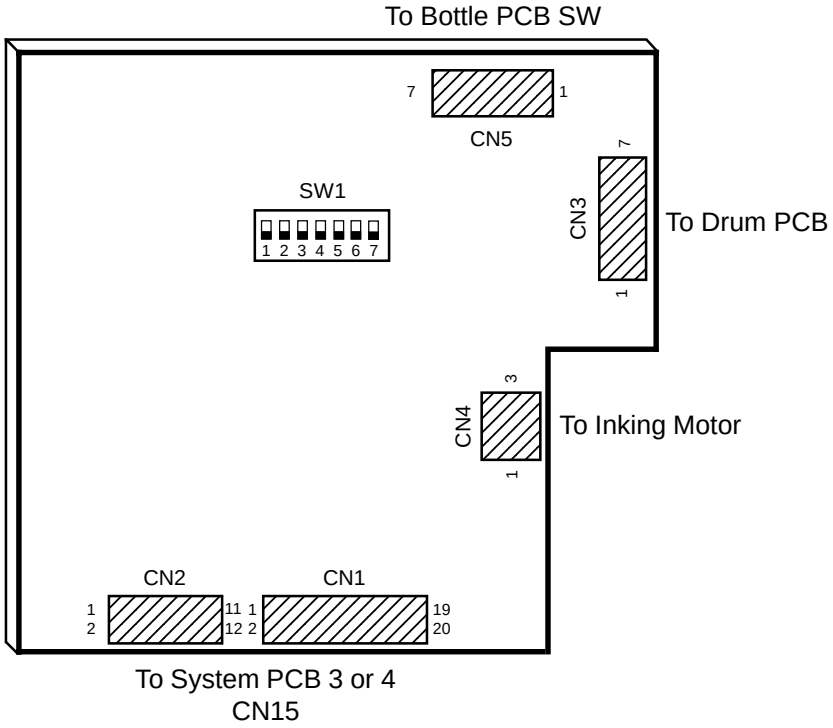
LED1: The actuator of Elevator upper limit sensor is raised to open the light path.


CN1 9pins
To System PCB 3
To P-F Tray Safety SW (Lower)
SW
Rd
+24VA 1
N.C. 2
+24VB 3
+24VB 4
GND3 5
GND3 6
GND3 7
+5V 8
GND1 9
Bk
Or
Br
PowerSupply PCB CN2
CN4 2pins
Main Motor(-) 1
Main Motor(+) 2
Bl
M
Main Motor
Gr
Shielded Wire
CN5 10pins
GND 1
TKCNT1/ 2
TKCNT2/ 3
AKEN 4
UPSNO 5
TKUPS 6
TKSAF 7
TKDNS 8
TKOKL/ 9
TKOKH 10
SF3000(Option) Junction Connector (36pins)
CN2 15pins
GND1 1
GND1 2
RESET/ 3
ElevatorCTL1 4
ElevatorCTL2 5
Main Motor CTL1 6
Main Motor CTL2 7
Main Motor CTL3 8
Main Motor CTL4 9
A Detection Sig. 10
Paper Position Sig. 11
Elevator Lower Limit SW 12
P-F Tray SafetySW 13
Main Motor SafetySW 14
P-F Pressure Adj.SW 15
Gy
System PCB 4 CN10
CN6 8pins
AKEN-0 1
MCNT4-0 2
MCNT3-0 3
MCNT2-0 4
MCNT1-0 5
GND 6
FGSEN-0 7
GND 8
Open
CN3 16pins
N.C. 1
N.C. 2
Elevator Motor(+) 3
Elevator Motor(-) 4
+5V 5
LOW when blocked 6
GND 7
LOW when pressed 8
GND1 9
150Ω 10
+5V 11
Upper Limit Sensor 12
GND 13
+5V 14
Encoder Sensor 15
GND 16
Yw
Or
Rd
Bl
Br
Bk
Wh
Gy
Vt
Gr
M
Elevator Motor
SEN
Elevator Lower Limit Sensor
SW
P-F Pressure Adj.SW
SEN
Elevator Upper Limit Sensor
SEN
Main Motor Encoder Sensor

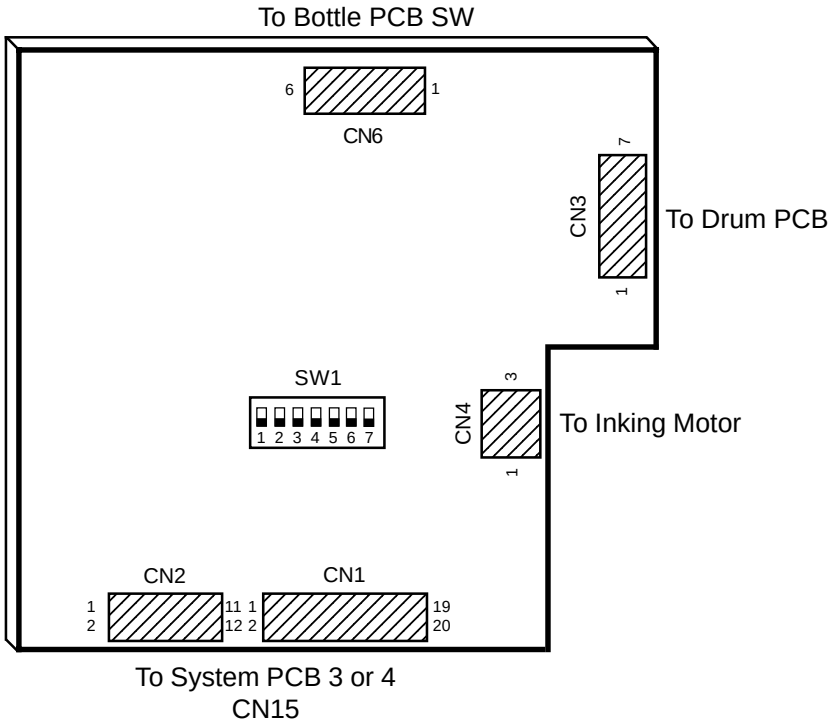
6. DRUM CONTROL PCB (1/2)

6. DRUM CONTROL PCB

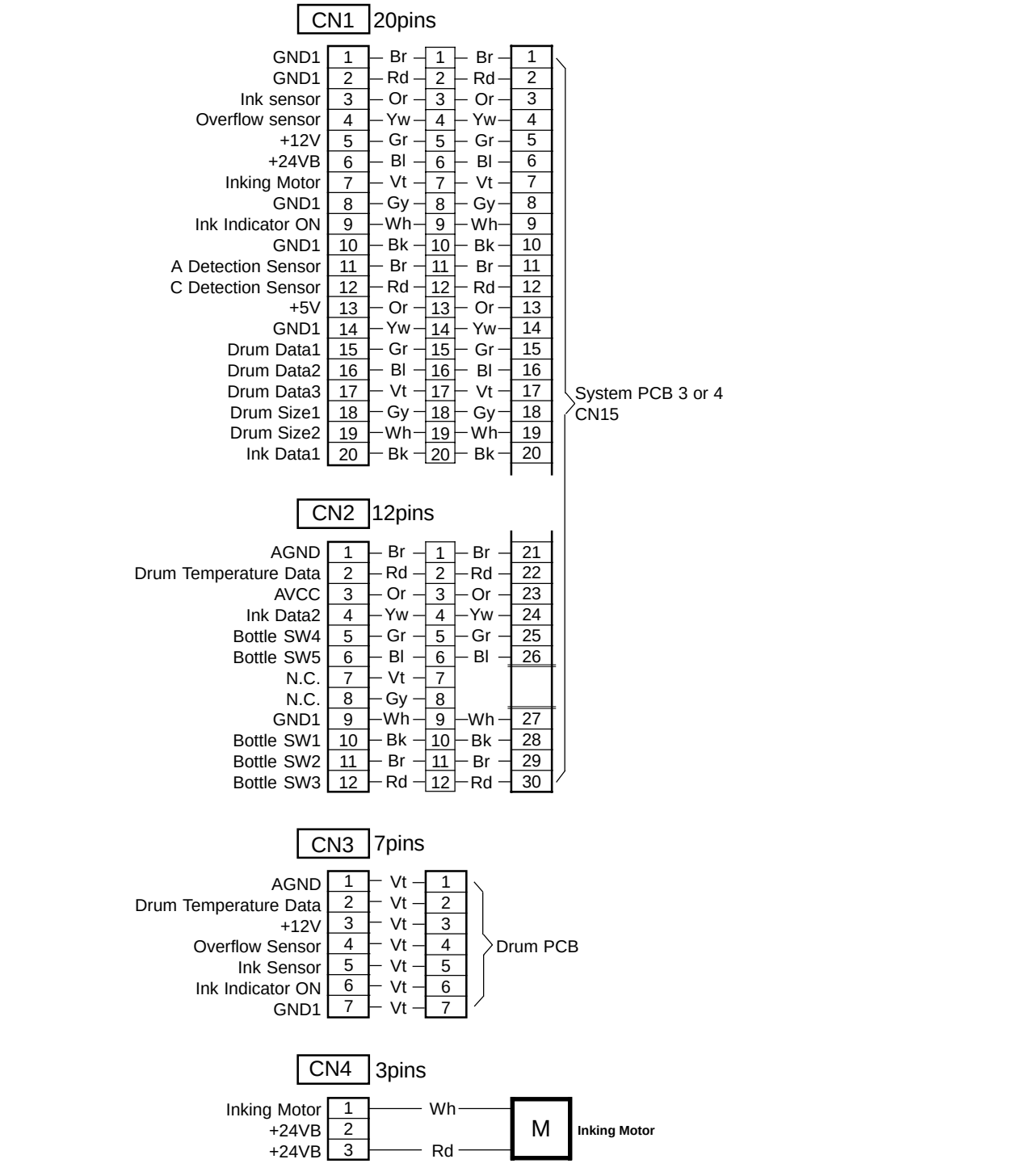
6-1. DRUM CONTROL PCB3 (Black Drum)



6-2. DRUM CONTROL PCB2 (Color Drum)

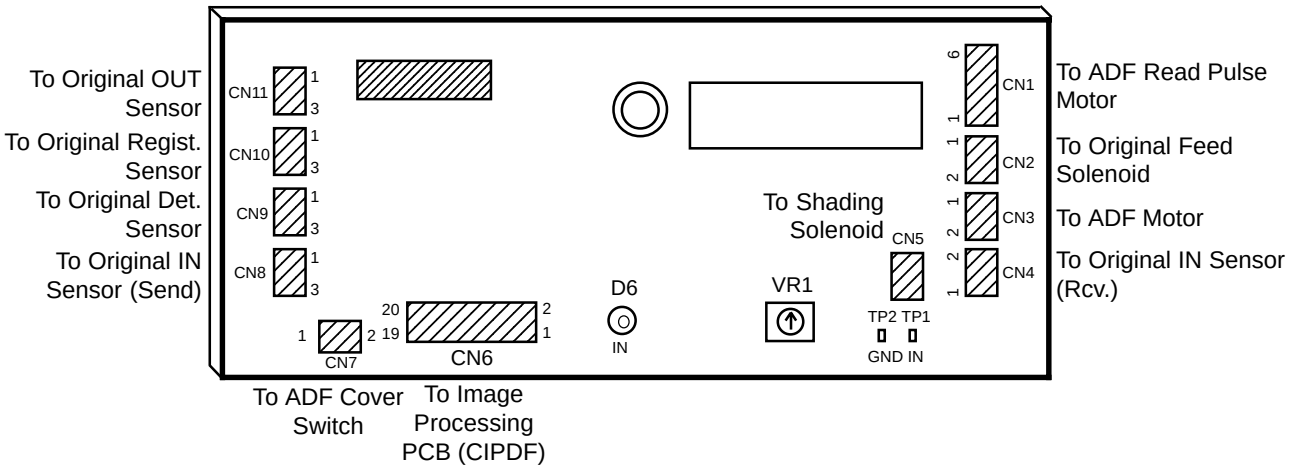


6. DRUM CONTROL PCB 3(2/2)


CN1 20pins
GND1 1 Br 1 Br 1
GND1 2 Rd 2 Rd 2
Ink sensor 3 Or 3 Or 3
Overflow sensor 4 Yw 4 Yw 4
+12V 5 Gr 5 Gr 5
+24VB 6 Bl 6 Bl 6
Inking Motor 7 Vt 7 Vt 7
GND1 8 Gy 8 Gy 8
Ink Indicator ON 9 Wh 9 Wh 9
GND1 10 Bk 10 Bk 10
A Detection Sensor 11 Br 11 Br 11
C Detection Sensor 12 Rd 12 Rd 12
+5V 13 Or 13 Or 13
GND1 14 Yw 14 Yw 14
Drum Data1 15 Gr 15 Gr 15
Drum Data2 16 Bl 16 Bl 16
Drum Data3 17 Vt 17 Vt 17
Drum Size1 18 Gy 18 Gy 18
Drum Size2 19 Wh 19 Wh 19
Ink Data1 20 Bk 20 Bk 20
System PCB 3 or 4
CN15
CN2 12pins
AGND 1 Br 1 Br 21
Drum Temperature Data 2 Rd 2 Rd 22
AVCC 3 Or 3 Or 23
Ink Data2 4 Yw 4 Yw 24
Bottle SW4 5 Gr 5 Gr 25
Bottle SW5 6 Bl 6 Bl 26
N.C. 7 Vt 7
N.C. 8 Gy 8
GND1 9 Wh 9 Wh 27
Bottle SW1 10 Bk 10 Bk 28
Bottle SW2 11 Br 11 Br 29
Bottle SW3 12 Rd 12 Rd 30
CN3 7pins
AGND 1 Vt 1
Drum Temperature Data 2 Vt 2
+12V 3 Vt 3
Overflow Sensor 4 Vt 4
Ink Sensor 5 Vt 5
Ink Indicator ON 6 Vt 6
GND1 7 Vt 7
Drum PCB
CN4 3pins
Inking Motor 1 Wh
+24VB 2
+24VB 3 Rd
M
Inking Motor
CN5 7pins
Drum Control PCB3
(Black Drum)
GND 1 Br 1
+5V 2 Rd 2
Bottle SW1 3 Or 3
Bottle SW2 4 Yw 4
Bottle SW3 5 Gr 5
Bottle SW4 6 Bl 6
Bottle SW5 7 Vt 7
Bottle SW PCB
CN6 6pins
Drum Control PCB2
(Color Drum)
GND 1 Rd 1
Bottle SW1 2 Rd 2
GND 3 Y w 3
Bottle SW2 4 Y w 4
GND 5 Gr 5
Bottle SW3 6 Gr 6
Bottle SW PCB

7. ADF PCB(1/2)

7. ADF PCB



VR

VR1 : For sensitivity adjustment of Original IN Sensor (Rcv.)

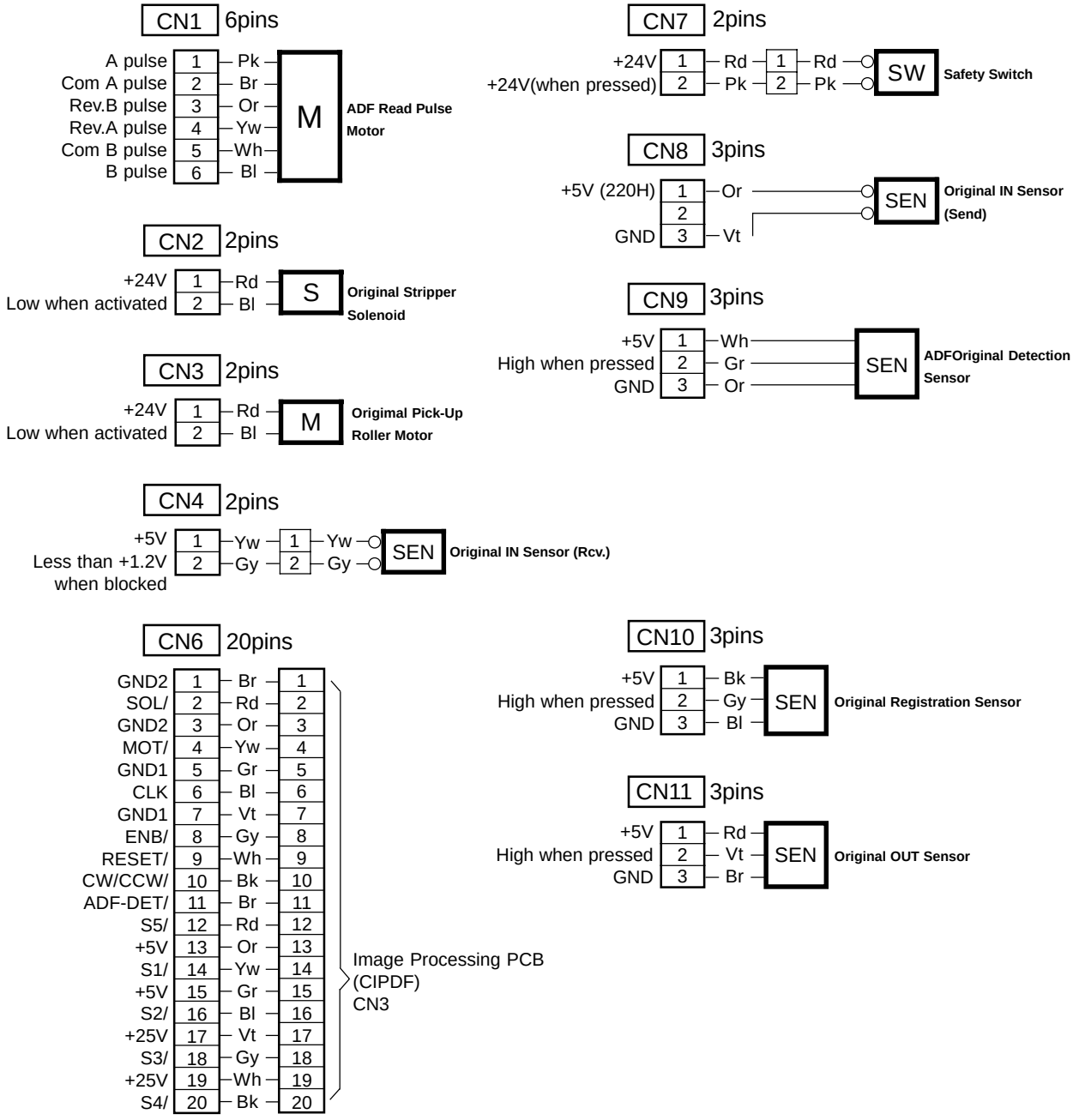
LED **- When LED is ON -**

D6(IN) : The light path of the Original IN Sensor is blocked.

TP

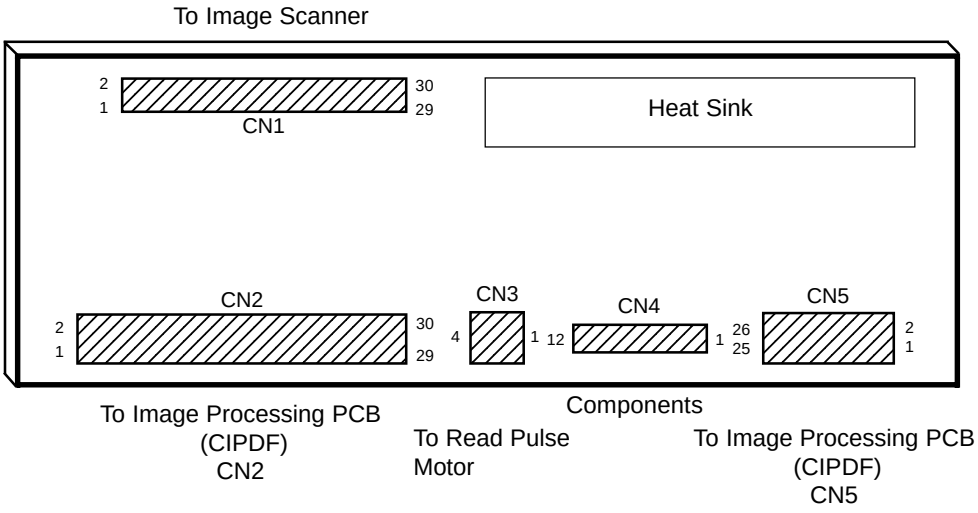
TP1 (IN) : For sensitivity adjustment of Original IN Sensor
TP2 (GND) : For sensitivity adjustment of Original IN Sensor (GND)

7. ADF PCB(2/2)

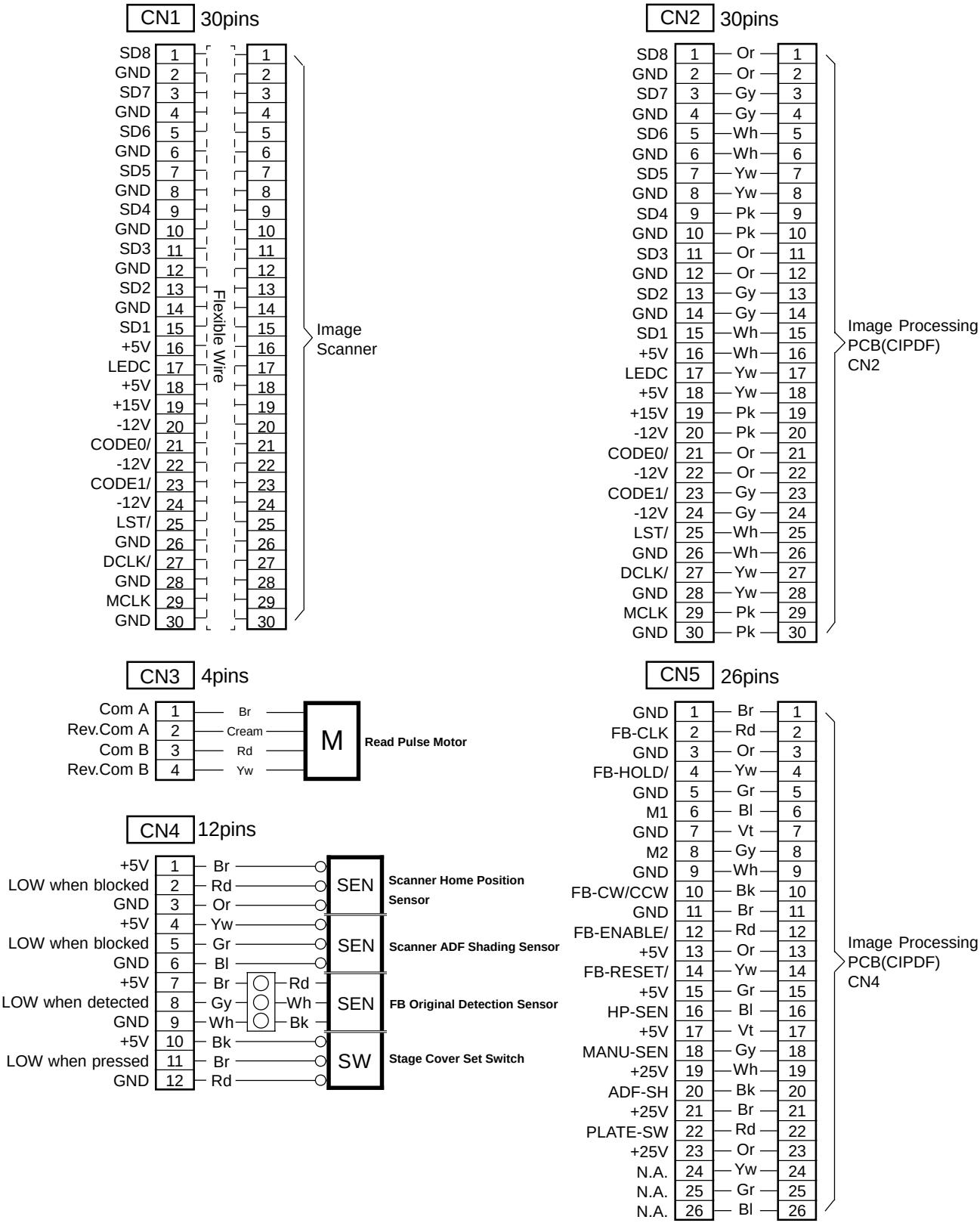

CN1 6pins
A pulse 1 Pk
Com A pulse 2 Br
Rev.B pulse 3 Or
Rev.A pulse 4 Yw
Com B pulse 5 Wh
B pulse 6 Bl
M
ADF Read Pulse Motor
CN2 2pins
+24V 1 Rd
Low when activated 2 Bl
S
Original Stripper Solenoid
CN3 2pins
+24V 1 Rd
Low when activated 2 Bl
M
Origimal Pick-Up Roller Motor
CN4 2pins
+5V 1 Yw
Less than +1.2V 2 Gy
when blocked
SEN
Original IN Sensor (Rcv.)
CN6 20pins
GND2 1 Br 1
SOL/ 2 Rd 2
GND2 3 Or 3
MOT/ 4 Yw 4
GND1 5 Gr 5
CLK 6 Bl 6
GND1 7 Vt 7
ENB/ 8 Gy 8
RESET/ 9 Wh 9
CW/CCW/ 10 Bk 10
ADF-DET/ 11 Br 11
S5/ 12 Rd 12
+5V 13 Or 13
S1/ 14 Yw 14
+5V 15 Gr 15
S2/ 16 Bl 16
+25V 17 Vt 17
S3/ 18 Gy 18
+25V 19 Wh 19
S4/ 20 Bk 20
Image Processing PCB
(CIPDF)
CN3
CN7 2pins
+24V 1 Rd 1 Rd
+24V(when pressed) 2 Pk 2 Pk
SW
Safety Switch
CN8 3pins
+5V (220H) 1 Or
2
GND 3 Vt
SEN
Original IN Sensor (Send)
CN9 3pins
+5V 1 Wh
High when pressed 2 Gr
GND 3 Or
SEN
ADFOriginal Detection Sensor
CN10 3pins
+5V 1 Bk
High when pressed 2 Gy
GND 3 Bl
SEN
Original Registration Sensor
CN11 3pins
+5V 1 Rd
High when pressed 2 Vt
GND 3 Br
SEN
Original OUT Sensor

8. FLAT BED PCB 2(1/2)

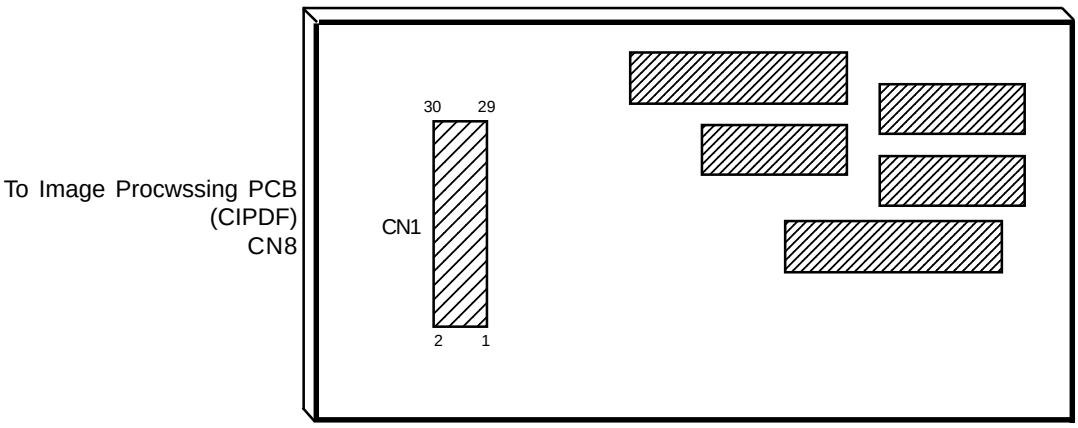
8. FLAT BED PCB 2



8. FLAT BED PCB 2(2/2)



9. TRIMMING PCB 2

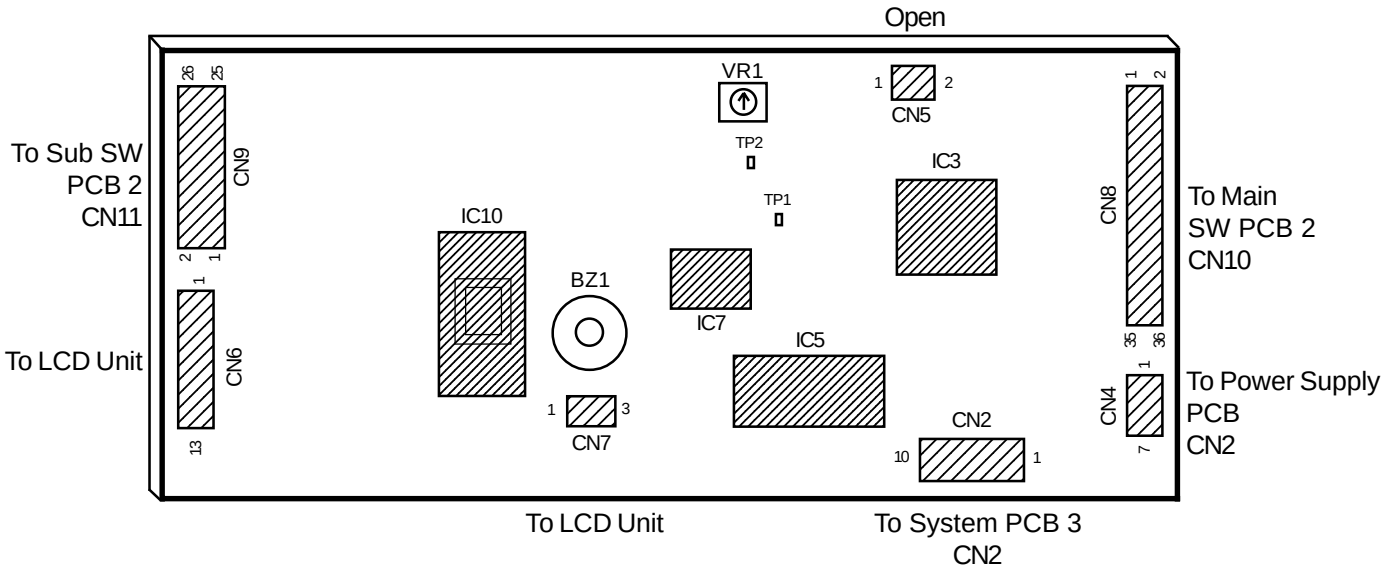


CN1 30pins

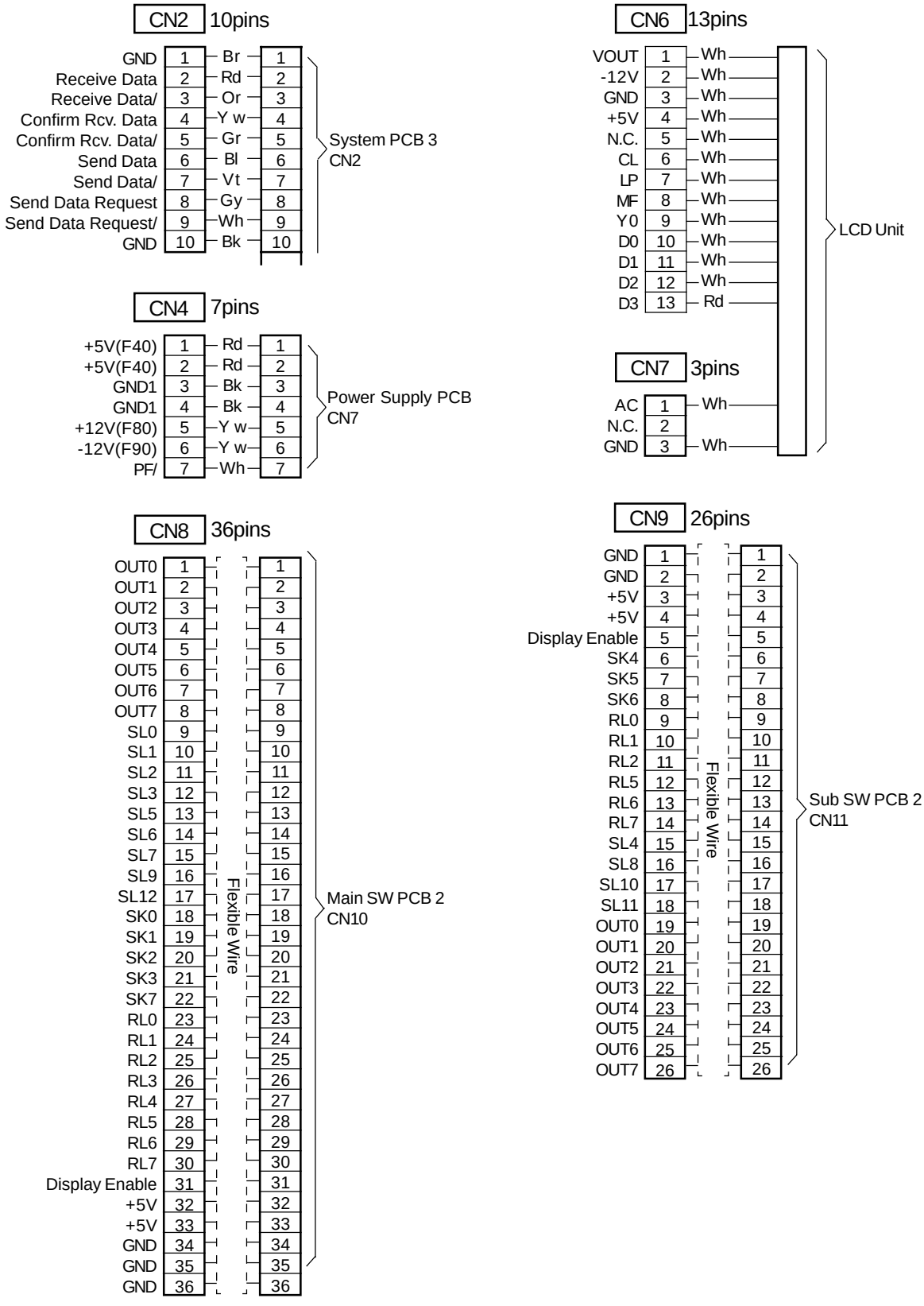
+5V	1	Image Processing PCB (CIPDF) CN8
+5V	2	
LST/	3	
VCK	4	
ENABLE/	5	
SOUT/	6	
WHITE/	7	
PS/	8	
R-W-START/	9	
S-K-SIG/	10	
BUSY-READY/	11	
END/	12	
SIZE1	13	
SIZE2	14	
SIZE3	15	
MS/	16	
CLEAR/	17	
TOP/	18	
N.C.	19	
SM/	20	
PHOTO/	21	
CP/	22	
GND	23	
GND	24	
GND	25	
GND	26	
GND	27	
GND	28	
GND	29	
GND	30	

10. PANEL CONTROL PCB

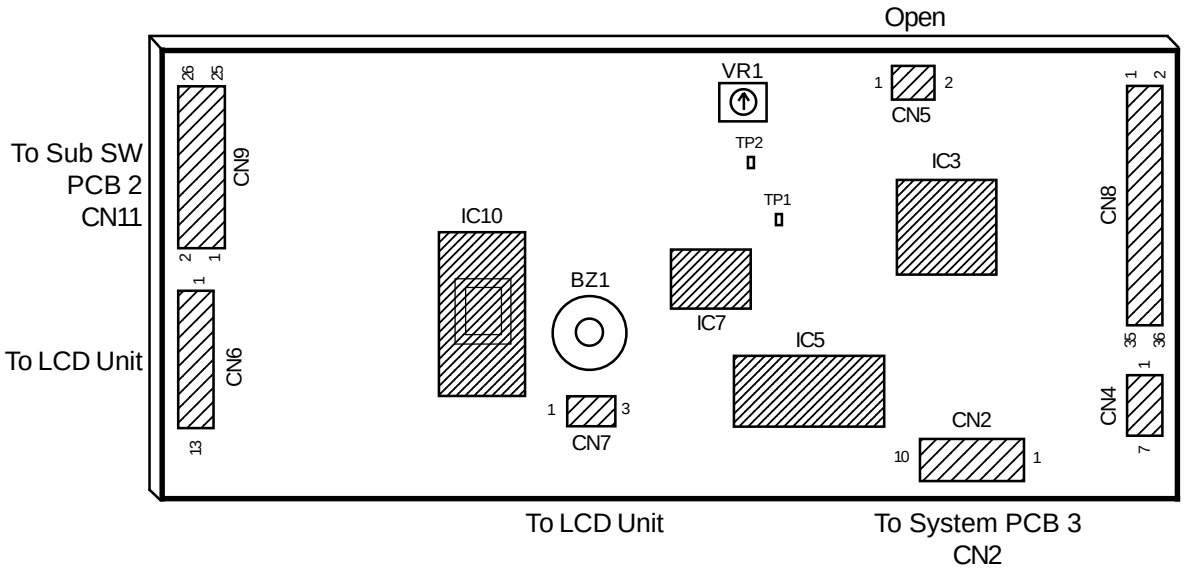
10-1. Panel Control PCB 2



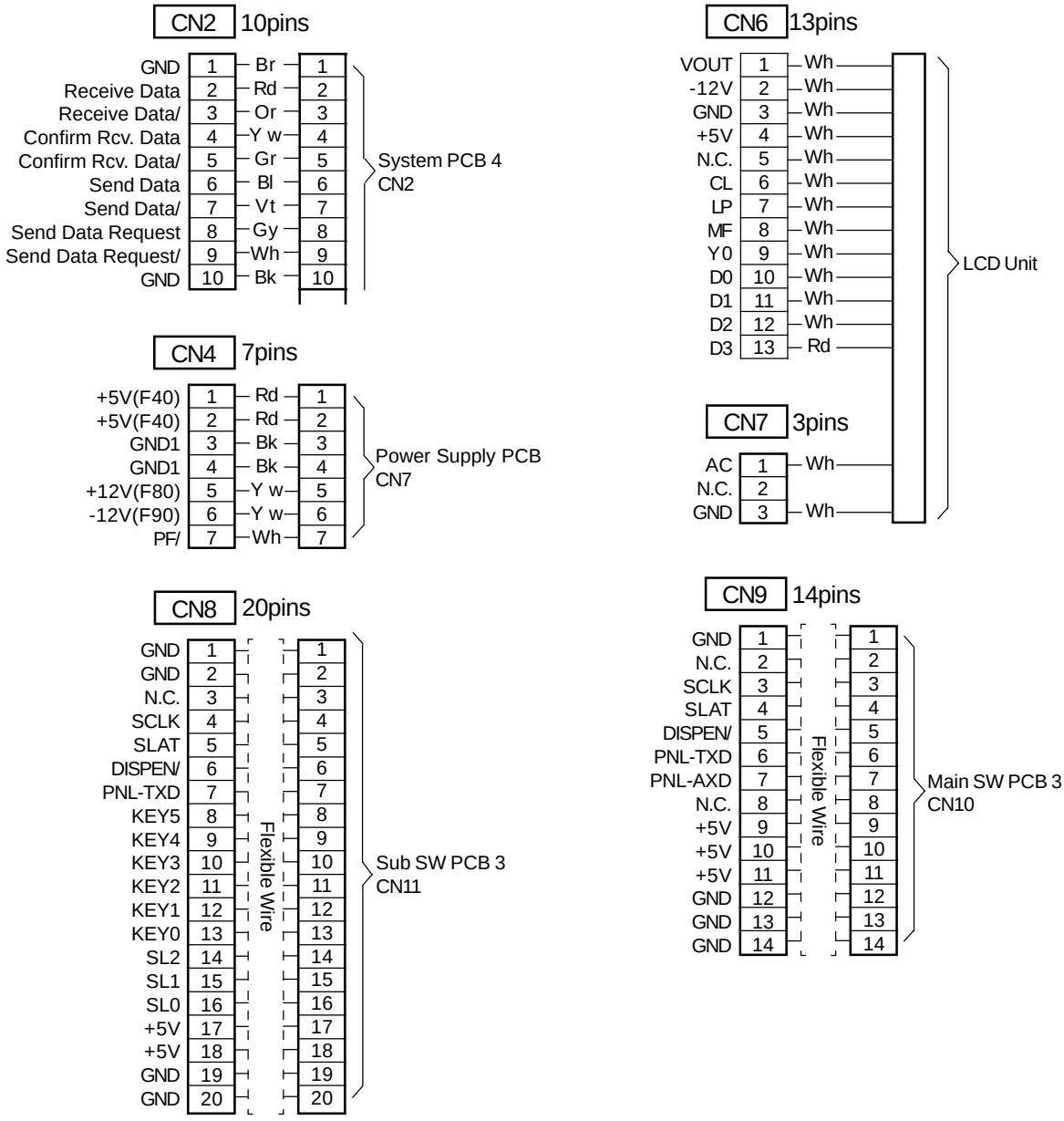
10. PANEL CONTROL PCB(2/4) Panel Control PCB 2



10-2. Panel Control PCB 3

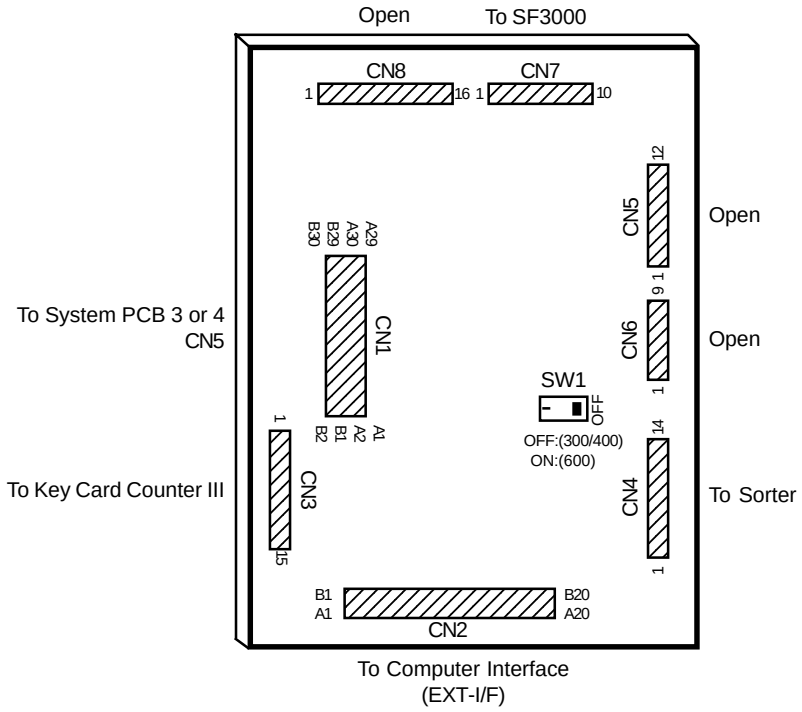


10. PANEL CONTROL PCB(4/4) Panel Control PCB 3



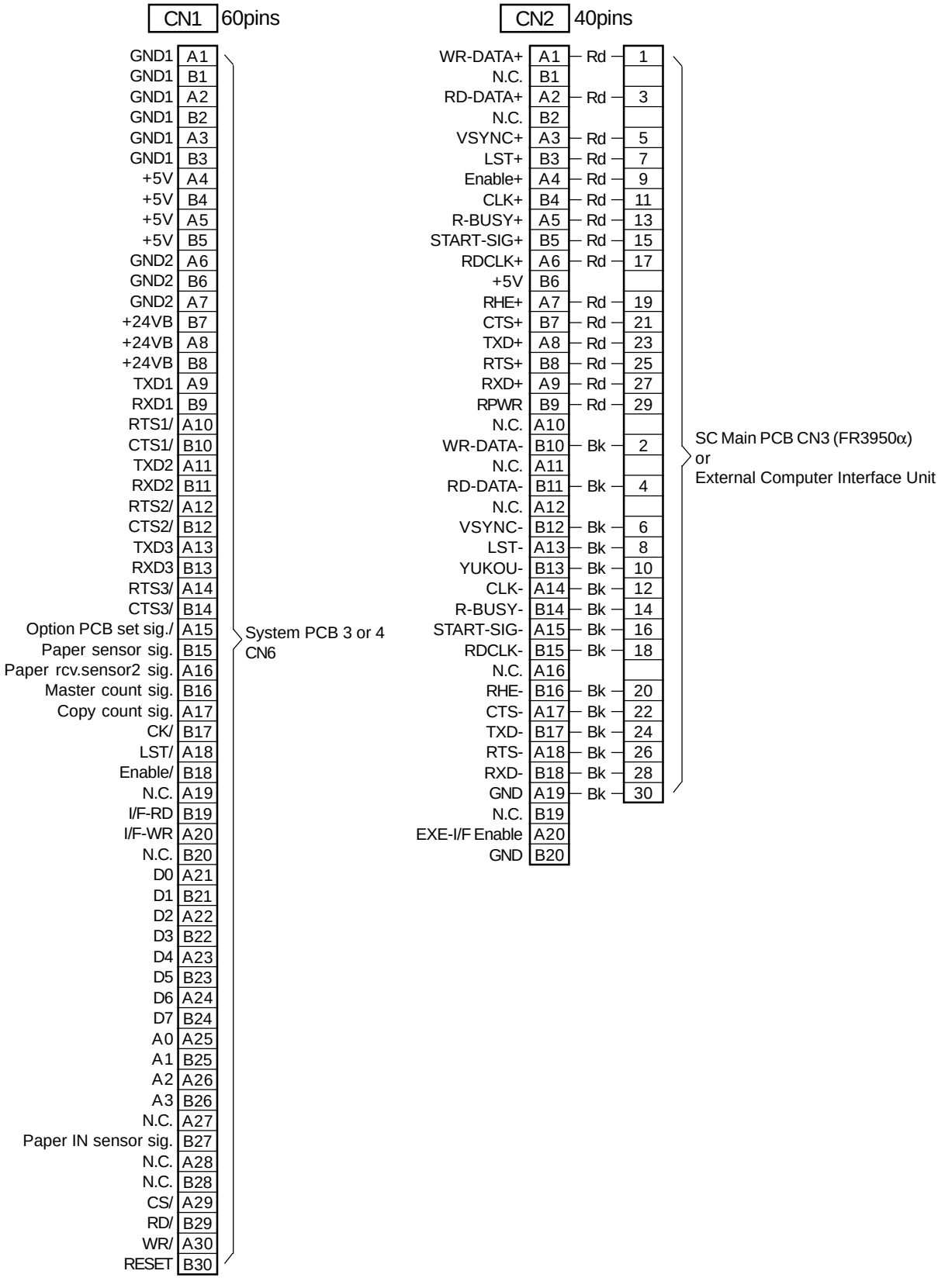
11. OPTION PCB A III(1/3)

11. OPTION PCB A III

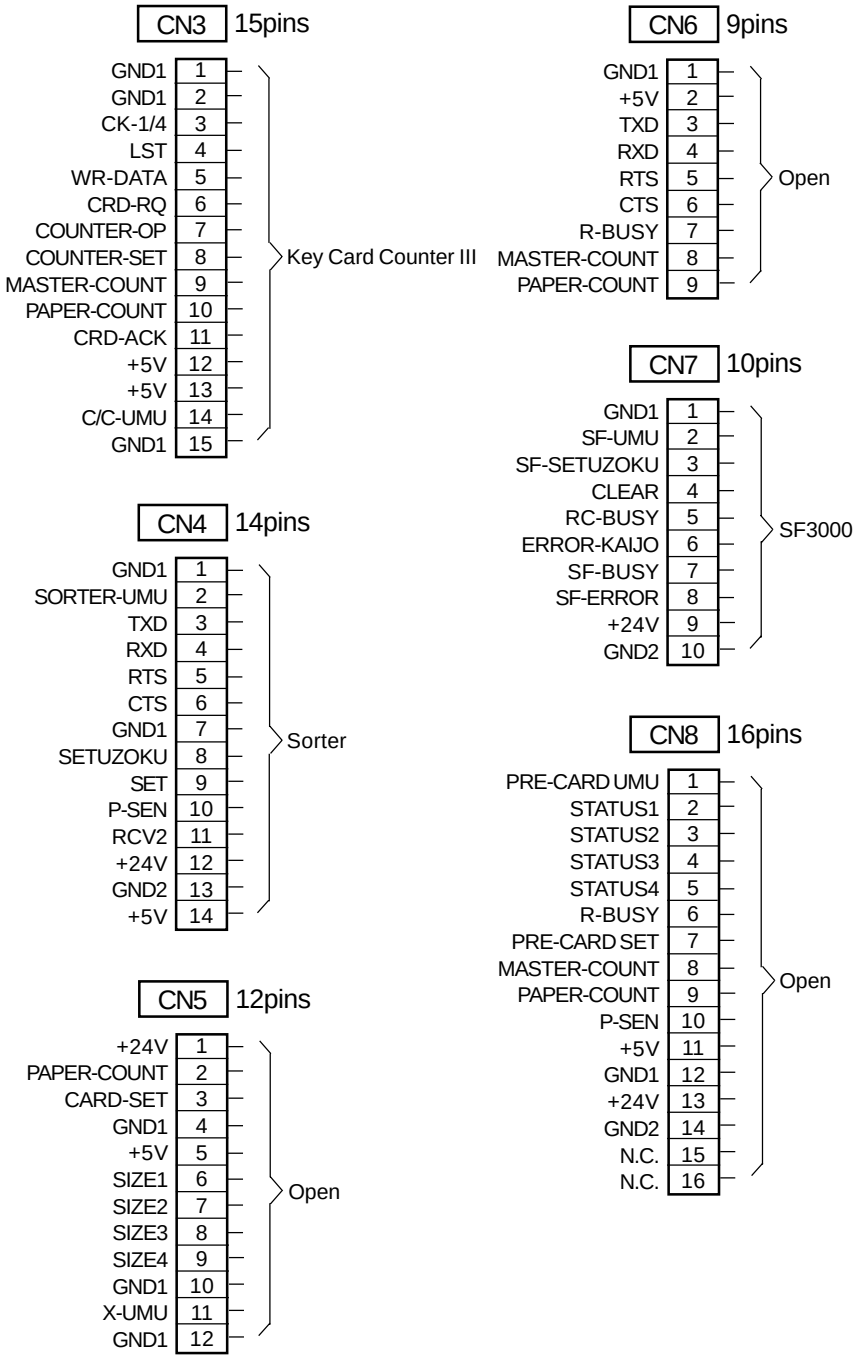


Note: FR3950α - Must set SW1 to OFF (300/400) position

11. OPTION PCB A III(2/3)



11. OPTION PCB A III(3/3)



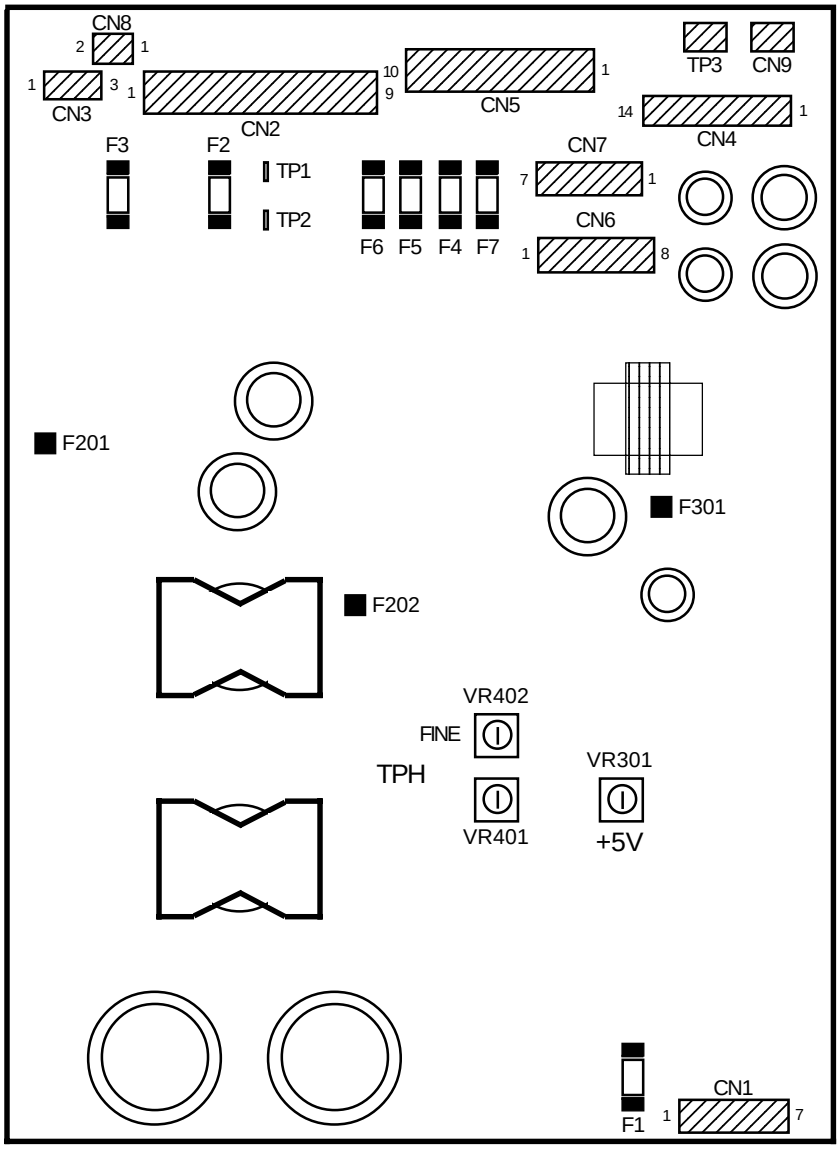
12. POWER SUPPLY PCB

FUSE REPLACEMENT

CAUTION: For continued protection against risk of fire,
replace only with same type and ratings of fuse(s).

Power Supply Model	120V Type		220-240V Type 019-51023-A Nichicon
	Nichicon 019-51038-N	Hitachi 019-51038-H	
F1	10A/AC125V	10A/AC125V	T5A/AC250V
F2	8A/AC125V	8A/AC125V	T6.3A/AC250V
F3	3.15A/AC125V	3.15A/AC125V	T3.15A/AC250V
F4	3.15A/AC125V	3.15A/AC125V	T3.15A/AC250V
F5	3.15A/AC125V	3.15A/AC125V	T3.15A/AC250V
F6	3.15A/AC125V	3.15A/AC125V	T3.15A/AC250V
F7	3.15A/AC125V	3.15A/AC125V	T3.15A/AC250V
F40	N/A	3 or 3.15A/AC125V	N/A
F80	N/A	3 or 3.15A/AC125V	N/A
F90	N/A	3 or 3.15A/AC125V	N/A
F201	3.15A/AC125V	N/A	3.15A/AC125V
F202	3.15A/AC125V	N/A	3.15A/AC125V
F301	3.15A/AC125V	N/A	3.15A/AC125V

12-1. Power Supply PCB VII 100V (Nichicon) 019-51038-A



F1:
10A/AC125V

F2:
8A/AC125V

F3:
3.15A/AC125V

F4:
3.15A/AC125V

F5:
3.15A/AC125V

F6:
3.15A/AC125V

F7:
3.15A/AC125V

F201:
3.15A/AC125V

F202:
3.15A/AC125V

F301:
3.15A/AC125V

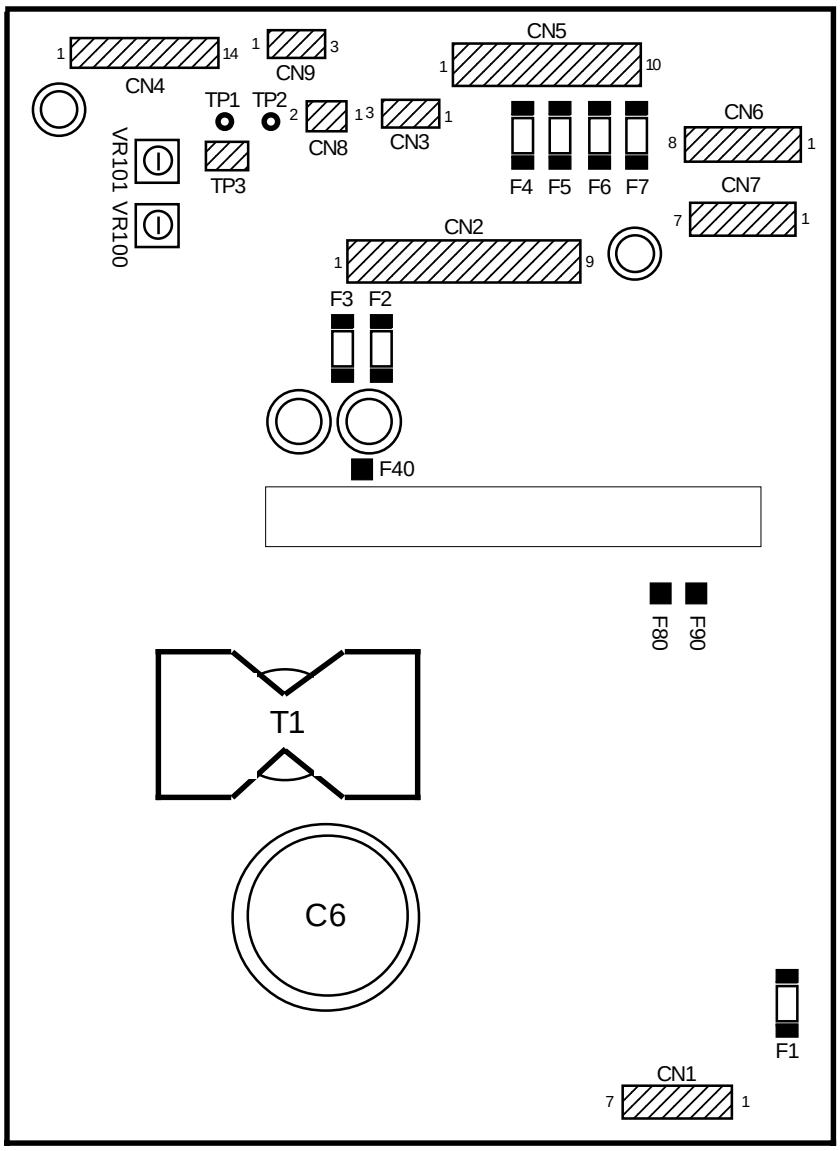
VR

VR301 : For +5V adjustment (Factory adjustment only)
VR401 : For TPH voltage adjustment (Rough)
VR402 : For TPH voltage adjustment (Fine)

Connector

CN1 : AC Input
CN2 : To Motor Control PCB,Safety SW
CN3 : To Suction Fan
CN4 : To TPH
CN5 : To System PCB
CN6 : To Image Processing PCB(CIPDF)
CN7 : To Panel Control PCB
CN8 : To Power Supply Fan
CN9 : N/A

12-2. Power Supply PCB VII 100V (Hitachi) 019-51038-A



F1:
10A/AC125V

F2:
8A/AC125V

F3:
3.15A/AC125V

F4:
3.15A/AC125V

F5:
3.15A/AC125V

F6:
3.15A/AC125V

F7:
3.15A/AC125V

F40:
3A/AC125V

F80:
3A/AC125V

F90:
3A/AC125V

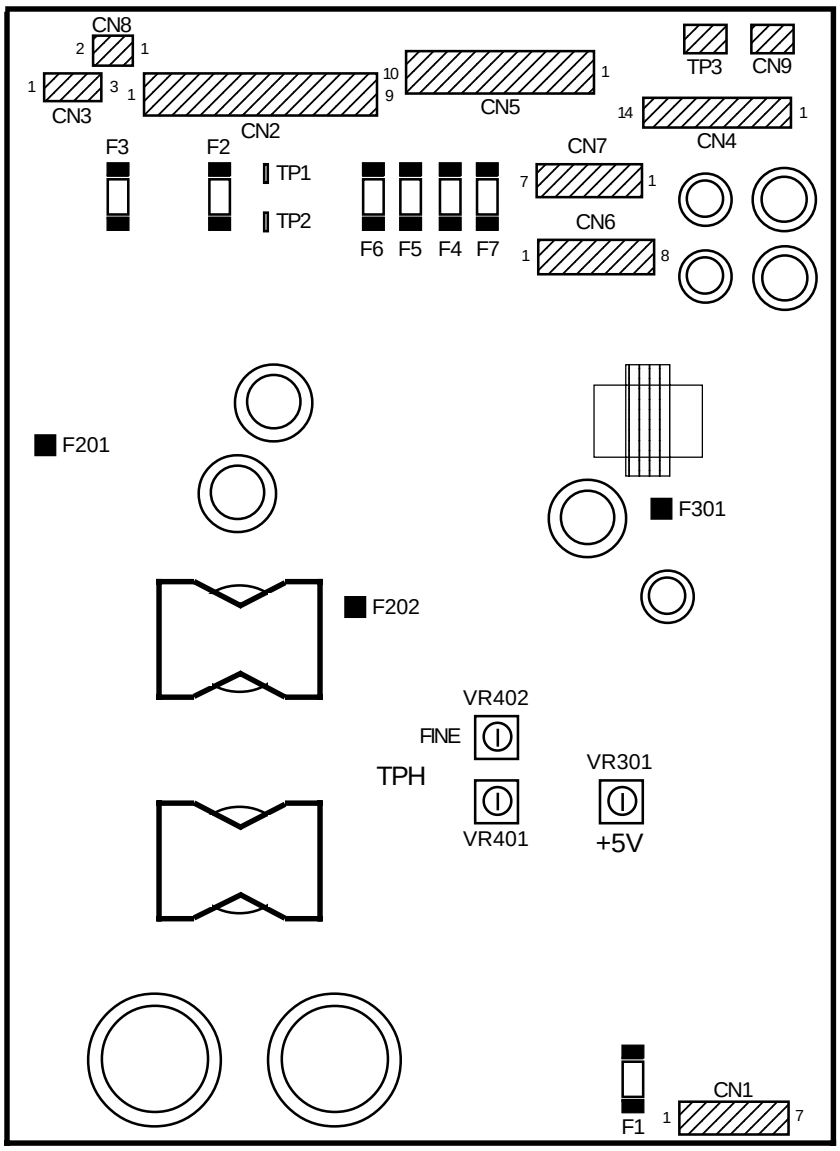
VR

VR100 : For TPH voltage adjustment (Rough)
VR101 : For TPH voltage adjustment (Fine)

Connector

CN1 : AC Input
CN2 : To Motor Control PCB,Safety SW
CN3 : To Suction Fan
CN4 : To TPH
CN5 : To System PCB
CN6 : To Image Processing PCB(CIPDF)
CN7 : To Panel Control PCB
CN8 : To Power Supply Fan

12-3. Power Supply PCB N200V (Nichicon) 019-51023-A



F1:
5A/AC250V

F2:
6.3A/AC250V

F3:
3.15A/AC250V

F4:
3.15A/AC250V

F5:
3.15A/AC250V

F6:
3.15A/AC250V

F7:
3.15A/AC250V

F201:
3.15A/AC125V

F202:
3.15A/AC125V

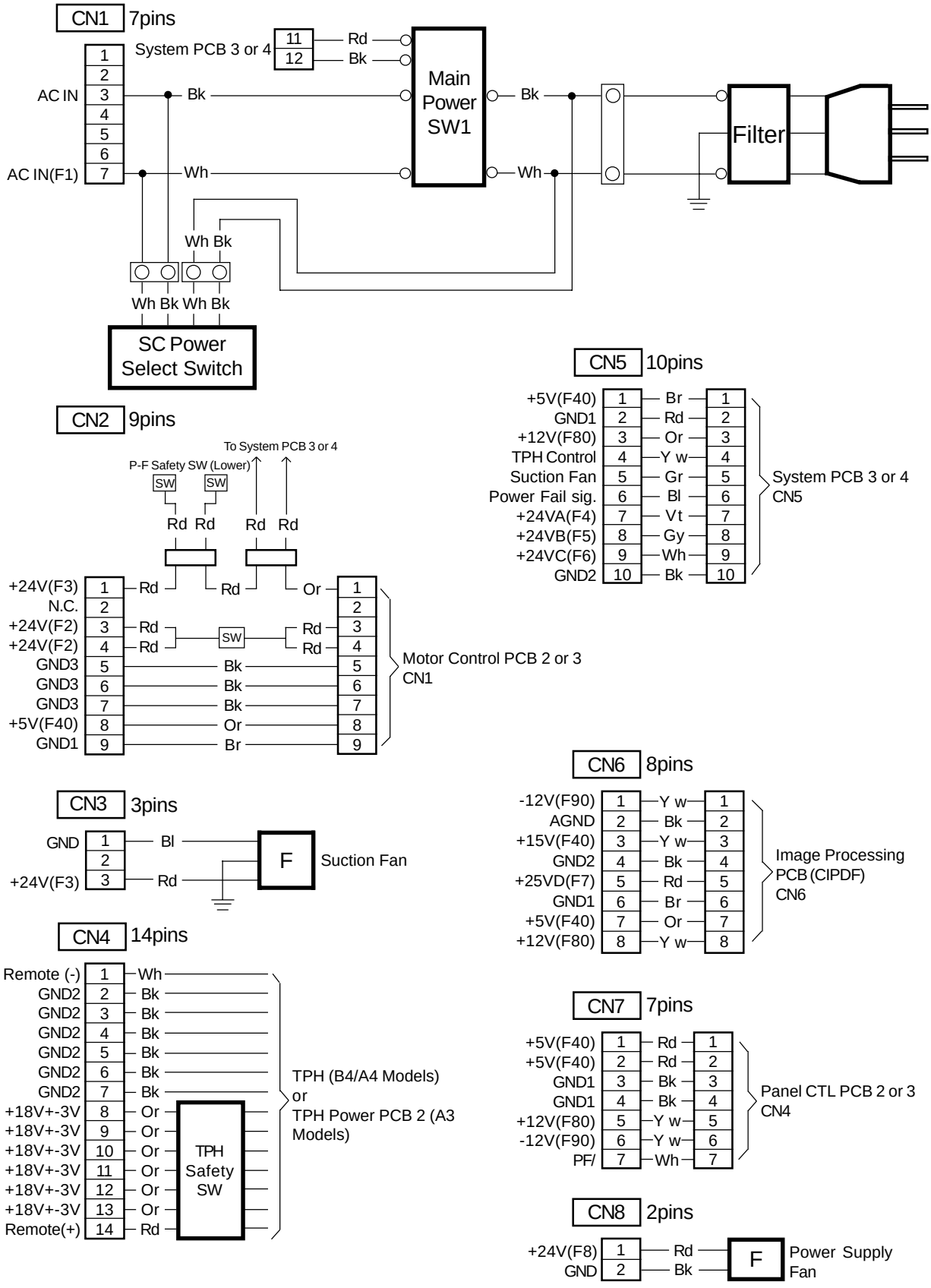
F301:
3.15A/AC125V

VR

VR301 : For +5V adjustment (Factory adjustment only)
VR401 : For TPH voltage adjustment (Rough)
VR402 : For TPH voltage adjustment (Fine)

Connector

CN1 : AC Input
CN2 : To Motor Control PCB,Safety SW
CN3 : To Suction Fan
CN4 : To TPH
CN5 : To System PCB
CN6 : To Image Processing PCB(CIPDF)
CN7 : To Panel Control PCB
CN8 : To Power Supply Fan
CN9 : N/A

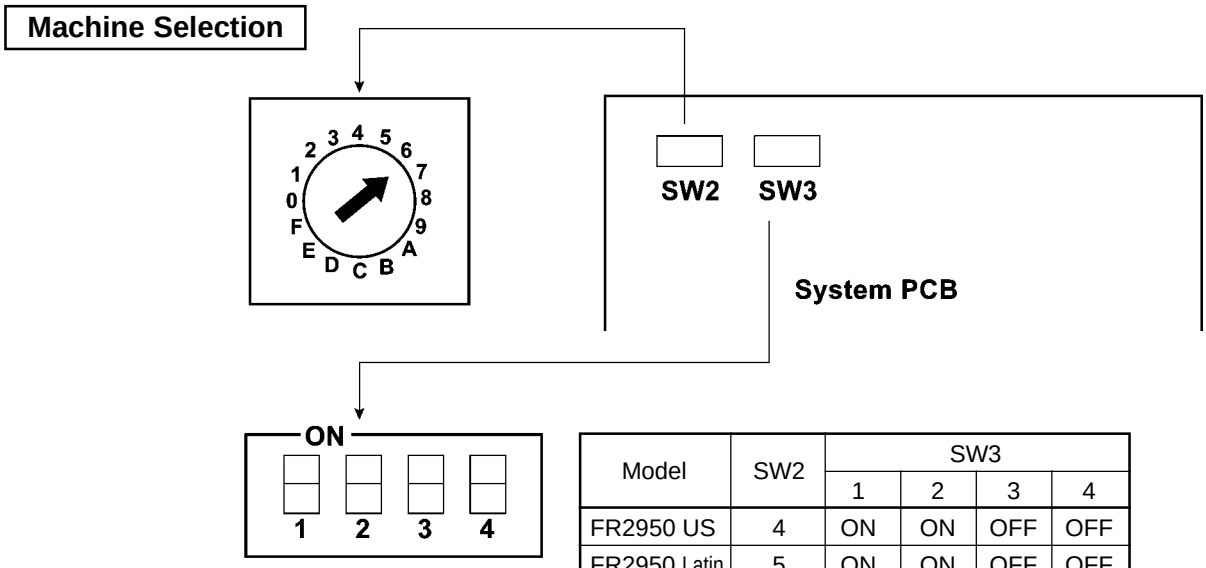

CN1 7pins
System PCB 3 or 4
11 Rd
12 Bk
AC IN
AC IN(F1)
Bk
Wh
Main Power SW1
Filter
Wh Bk
Wh Bk Wh Bk
SC Power Select Switch
CN5 10pins
+5V(F40) 1 Br 1
GND1 2 Rd 2
+12V(F80) 3 Or 3
TPH Control 4 Y w 4
Suction Fan 5 Gr 5
Power Fail sig. 6 Bl 6
+24VA(F4) 7 Vt 7
+24VB(F5) 8 Gy 8
+24VC(F6) 9 Wh 9
GND2 10 Bk 10
System PCB 3 or 4 CN5
CN2 9pins
To System PCB 3 or 4
P-F Safety SW (Lower)
SW
Rd Rd Rd Rd
+24V(F3) 1 Rd Rd Or 1
N.C. 2
+24V(F2) 3 Rd Rd 3
+24V(F2) 4 Rd Rd 4
GND3 5 Bk 5
GND3 6 Bk 6
GND3 7 Bk 7
+5V(F40) 8 Or 8
GND1 9 Br 9
Motor Control PCB 2 or 3 CN1
CN6 8pins
-12V(F90) 1 Y w 1
AGND 2 Bk 2
+15V(F40) 3 Y w 3
GND2 4 Bk 4
+25VD(F7) 5 Rd 5
GND1 6 Br 6
+5V(F40) 7 Or 7
+12V(F80) 8 Y w 8
Image Processing PCB (CIPDF) CN6
CN3 3pins
GND 1 Bl
2
+24V(F3) 3 Rd
F
Suction Fan
CN4 14pins
Remote (-) 1 Wh
GND2 2 Bk
GND2 3 Bk
GND2 4 Bk
GND2 5 Bk
GND2 6 Bk
GND2 7 Bk
+18V+-3V 8 Or
+18V+-3V 9 Or
+18V+-3V 10 Or
+18V+-3V 11 Or
+18V+-3V 12 Or
+18V+-3V 13 Or
Remote(+) 14 Rd
TPH Safety SW
TPH (B4/A4 Models) or TPH Power PCB 2 (A3 Models)
CN7 7pins
+5V(F40) 1 Rd 1
+5V(F40) 2 Rd 2
GND1 3 Bk 3
GND1 4 Bk 4
+12V(F80) 5 Y w 5
-12V(F90) 6 Y w 6
PF/ 7 Wh 7
Panel CTL PCB 2 or 3 CN4
CN8 2pins
+24V(F8) 1 Rd
GND 2 Bk
F
Power Supply Fan

APPENDIX

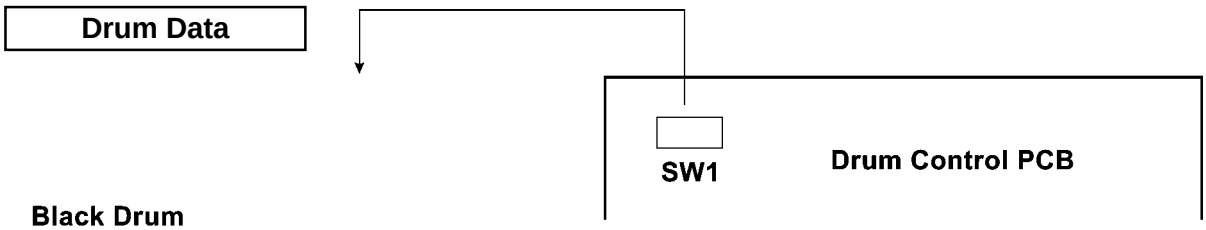
Contents

1. Machine Model Setting :USA, Latin America APX-1

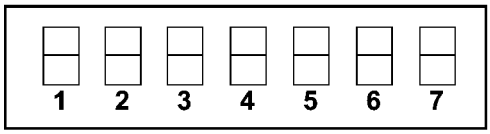
1. Machine Model Setting :USA, Latin America



Model	SW2	SW3			
		1	2	3	4
FR2950 US	4	ON	ON	OFF	OFF
FR2950 Latin	5	ON	ON	OFF	OFF
FR3950 US	C	ON	ON	OFF	OFF
FR3950 Latin	D	ON	ON	OFF	OFF

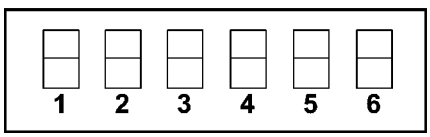


Black Drum



	1	2	3	4	5	6	7
Legal	ON	ON	OFF	OFF	OFF	ON	OFF
B4	ON	ON	ON	OFF	OFF	ON	OFF
Ledger	ON	ON	ON	OFF	OFF	ON	OFF
A3	ON	ON	OFF	OFF	OFF	ON	OFF
A4W	ON	ON	OFF	ON	OFF	ON	OFF
Letter W	ON	ON	ON	ON	OFF	ON	OFF

Color Drum



	1	2	3	4	5	6
Legal	ON	ON	OFF	OFF	ON	OFF
B4	ON	ON	ON	OFF	ON	OFF
Ledger	ON	ON	ON	OFF	ON	OFF
A3	ON	ON	OFF	OFF	ON	OFF
A4W	ON	ON	OFF	ON	ON	OFF
Letter W	ON	ON	ON	ON	ON	OFF